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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Economics of the Sugar Industry.

The work of the Bureau of Sugar Experiment Stations for the year just ended is reviewed comprehensively by the Director of the Bureau, Mr. H. T. Easterby, in his very complete and valuable annual report, just published. Remarkable progress has been made by the sugar industry in the course of the last few years, but last year was one of record production, the figures being 485,585 tons of raw sugar of 94 net titre. Seasonal conditions were, on the whole, favourable, but the large increase in the number of growers and consequential extension of cultivated areas and additional crushed tonnages were mainly responsible. The cane yield was 3,668,252 tons, and many of the Northern mills continued operating right through to January and February. The area cropped last year was 269,509 acres, of which cane from 189,466 acres was put through the mills. Thirty-five acres was the average area of each planter. The number of plantations of 5 acres and over totalled 6,730. The acreages of individual planters vary largely according to district and local conditions. From Cairns to Townsville the average is 48; Townsville to Mackay, 43; Bundaberg, the Isis, and Maryborough, 26; Maroochy and Logan, 9. The average yield of cane last year was 19.36 tons per acre, which was the best for some years; the average sugar yield was 2.56 tons, the second best on record. Ayr provided the highest figures for cane and sugar yield with 24.64 and 3.57 tons, respectively. Those who saw the particularly fine crops in the Lower Burdekin in 1925 can understand this. Ingham and Innisfail provided the next best sugar yield per acre with 2.89 tons. The quantity of cane required to make 1 ton of 94 net titre sugar was 7.55 tons, also the second best result to date. The lowest weight of cane required to make a ton of sugar is given as 6.89 in the Ayr, Bundaberg, and Gin Gin districts, the highest being 9.94 in the Isis, Maryborough, and Mount Bauple areas. The sugar yield from cane in New South Wales for the same period was 32,000 tons, and from beet in Victoria 2,315 tons. In Queensland there were 37 raw sugar mills

and 2 refineries, employing 6,581 people. In 1925, 18,164,416 gallons of molasses were extracted, and of this total 3,430,303 gallons were sold to distilleries; 3,681,394 burnt as furnace fuel; 2,176,649 sold as stock food; 319,485 sold for other purposes; 1,287,400 used as manure; 1,590,212 remained in storage; while 6,287,973 gallons were allowed to run to waste. (Allowing good raw material to run to waste amounts, so it would seem, almost to an economic crime.) The consumption of sugar within the Commonwealth was, according to last figures available, estimated to average 117 lb. per head of population—probably refined sugar. Southern critics of the industry are as clamant, though much less convincing, as ever, but the comparative cost of living table and other informative data embodied in Mr. Easterby's report supply an effective answer.

The Quality of Queensland Butter.

Referring to a recent publication of choicest butter percentages exported by the respective States in the Commonwealth, in which it was noticeable that Queensland butter manufactured during the last season did not occupy a very high place in the list, the Minister for Agriculture and Stock, Hon. W. Forgan Smith, has informed the Press that there were special reasons for this, and in fairness to those engaged in the industry here he thought the conditions should be made known. In the course of the period under review, the seasonal conditions prevailing in Queensland were most adverse to the manufacture of dairy products of high quality. Practically the whole of the dairying areas of the State were influenced by dry weather. Later the conditions became more and more severe, and caused a very material shrinkage in the volume of cream supplies and ultimately brought about disorganisation in delivery of cream from the farms to the factories. In portions of the State where failure of normal rainfall was most severely felt delivery of cream was reduced to once or twice a week service, and the somewhat reduced quality of the butter was attributable to the abnormally high percentage of aged cream delivered to the factories. It was also noteworthy, said the Minister, that the range of points of first-grade butter was from 90 to 91 points, and butter securing 92 points or higher was accepted as of choicest quality. Frequently, it happened that a large proportion of the butter submitted for export in this State was graded at 91 points, thereby missing the choicest quality classification by the narrow margin of one point. Taking the percentage of choicest and first-grade butter collectively, it will be seen that Queensland contributed a fair percentage of butter of high quality. Co-operative dairying companies engaged in the manufacture of butter in this State have during the last few years expended much money in the improvement of their factories, which are to-day better equipped than ever before, and he was confident that with the return of normal seasonal conditions the quality of dairy products from this State would be of higher quality than formerly. "As Minister for Agriculture," continued Mr. Forgan Smith, "I appreciate the necessity of the primary producers, the manufacturing companies, and the dairy officers of this Department, working together harmoniously with a view to the general improvement of quality. Herd-testing is another matter to which reference was made in the Press. The Department has carried out this work for some years past, and continues to make every endeavour to impress on farmers the importance of improving their herds. Unfortunately, the weather conditions have been against the dairy farmer, and a number of dairy cows have not had access to the usual rich pastures which are conducive to high milk production, and farmers have been unable to submit their herds for testing in numbers equal to that of last season. The recent rains, however, which have been fairly general throughout the dairying areas of this State, have completely changed the outlook for the dairy farmer, and I am hopeful that herd-testing will be taken up with increased interest in the immediate future. The necessary staff arrangements to carry out the testing of the herds are in existence, and the officers concerned are awaiting the call of the dairy farmer."

Faculty of Agriculture.

As announced in the course of the month by the Minister for Agriculture and Stock, Hon. W. Forgan Smith, financial provision has been made by the Cabinet to enable the Senate of the Queensland University to make preliminary arrangements for the establishment of a Faculty of Agriculure and the inauguration of a scheme of studies leading to the Degree of Bachelor of Science in Agriculture. The new Faculty has now been constituted. The course of studies leading on to graduation will extend over a period of four years, and will embrace the following subjects:—(*a*) First year: Biology I., Chemistry I., Physics I., Geology I., Elementary Engineering Drawing and Design. (*b*) Second year: Principles of Agriculture, Economic Entomology, Agricultural Chemistry I., Agricultural Geology, Botany II. (*c*) Third year: Agricultural Chemistry II., Plant Pathology, Botany

III., Agricultural Economics, Genetics of Plant Breeding, Agricultural Botany, Zootechny, Ailments of Live Stock, Dairying, &c. (*d*) Fourth year: Principles of Agriculture II., Agricultural Bacteriology, Farm Bookkeeping, Principles of Fruit Culture, Agricultural Engineering, Principles of Forestry, Veterinary Parasitology, Special Subject for intensive study (e.g., Entomology, Plant Pathology, Agricultural Chemistry, Agricultural Bacteriology, Agriculture, &c.). The students will attend lectures and engage in laboratory practice at the University during the first two years, and for the first and second terms of the third year. The third term of the third year and the first two terms of the fourth year will be spent at the Gatton Agricultural College. The students will return to the University at the end of the second term of their fourth year, and will do their final term's lecture and laboratory work at the University. Students who have qualified for matriculation in Science or Engineering will be eligible for admission to the Faculty of Agriculture. As a temporary measure for 1927 students who have qualified under the present syllabus for the Diploma of Agriculture at Gatton College will be accepted as matriculated students of the Faculty of Agriculture without further examination. Students will be enrolled in 1927 for the first year of the course. Arrangements are also being made to enable the Faculty to enrol any qualified students who may desire to enter upon the second year of the course in 1927. The research work which has been conducted in recent years by the Department of Biology into problems affecting the primary industries will be continued as an activity of the Faculty of Agriculture. As the work of the faculty develops it is hoped that greater facilities will be afforded for the scientific investigation of such problems.

An Agricultural Survey.

The commercial problems of agriculture are evident to all interested in the economic conditions of rural industry, and the announcement by Hon. W. Forgan Smith of the institution of an agricultural survey in Queensland in the course of the month was received cordially by all concerned in the progress of this State. The introduction of some system of general rural surveys is regarded as a necessary service to agriculture and the project is worthy of the support of every farmer. A thorough knowledge of the farm economics of a district, and, in fact, of the whole of the State, is essential to agriculture in the general advance which we hope it is about to make in Queensland. An agricultural survey may be likened to a soil survey. For example, merely by way of analogy, a broad survey may be made of a district, soil samples taken here and there, and a good general idea obtained of types of soil and their composition; or a small area may be investigated in detail, and by analyses a complete story of its soils unfolded, disclosing their origin and their differentiation. Both kinds of survey are necessary, for the former may give us something concrete on which to base advice on general questions of soil treatment, but there may arise problems which cannot be solved without the closer study involved in the latter which may then have to be applied to the whole district. The same thing applies in economics. Detailed investigation of farm costs and other relevant matters will provide the facts on which the farmer may be best advised in regard to his own individual affairs, but in the meantime a need exists for a broader consideration of systems of farming and farm management which will be made possible by making a more extended survey. It is to meet this need that a survey system is about to be introduced, a survey that will cover both particular and broader problems and secure data for the study of the farm economics of the State generally. A complete survey will show what capital is required to start farming in any given district, the system of farming suitable, the class of stock required, the country's carrying capacity, the labour necessary, the outgo and income of the first year, and the probable average income when the property is brought to the full profit stage. If it is a question of a small holding a survey will show the size of holding that can be worked by family labour, the system of farming most suitable, actual outside labour, if any, required, and the casual seasonal labour likely to be normally necessary. Apart from these more practical questions a survey will supply information on many important economic aspects of farming, such as the area necessary for any particular form of husbandry. It will also provide data of great value for educational and advisory purposes. A general agricultural survey will, in addition, bring to light the economic factors which influence farm management and the production and disposal of crops; will give guidence as to the local conditions that make for successful farming—soil treatment, cultivation, and so on; and afford definite reliable data as to markets and methods of marketing. To the individual farmer, it may be argued that all this information will be of little practical benefit, but for farmers as a body, and for agriculture generally, it should form the foundation of a real rural economic policy and help to place the industry on a solid and prosperous basis.

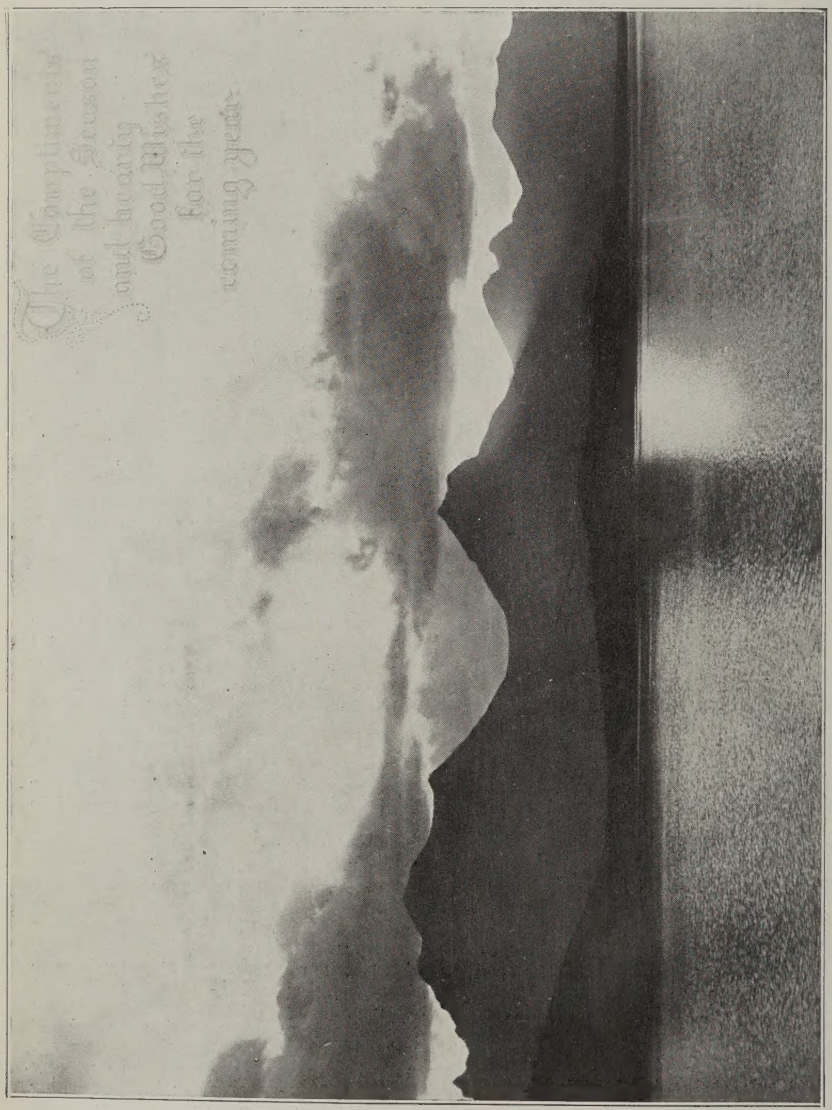


Photo.: H. W. Mobsby.

PLATE 1.—THE DAWN OF THE NEW YEAR.—SUNRISE IN HINCHINBROOK PASSAGE, NORTH QUEENSLAND.

The Minister's New Year Message

To the Farmers of Queensland

DEPARTMENT OF AGRICULTURE,
Brisbane, 31st December, 1926.

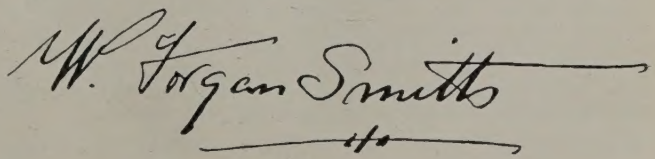
The recent bounteous rains may be accepted as a happy augury for the New Year, as the beginning of a cycle of good seasons and an era of good and well-established markets. May the farmers of Queensland enjoy all the success and general prosperity that the relieving rains betoken.

The adverse conditions with which the dying year was marked have aroused one's keenest sympathy for the people of the country in all their anxieties and discouragements. They also helped to strengthen an already strong admiration for their pluck and endurance when the odds, in seasonal setbacks, were almost overwhelming—a courage that is typical of the fine spirit of the Australian people in face of misfortune.

In the course of the year now closing further effect was given to the policy of the Government in relation to the Agricultural Industry, particularly in its economical aspects. The passing of the Primary Producers' Organisation and Marketing Act, which consolidates and improves the agricultural measures of preceding sessions, was a mark of further progress towards establishing agriculture in Queensland as a prosperous industry providing the means for the enjoyment by rural society of the opportunities and amenities of life, which are the moral right of a nation's citizens.

I look to the farmers of this State to study carefully the problems that affect their own interests and to act accordingly. In proportion to the loyalty and enlightened interest they display in their own organisation so will personal benefit accrue and agriculture advance.

I wish the farmers of Queensland good seasons and good markets in the coming year and the years that are to follow; that prosperity will be brought to their homes, and happiness to their families through a long future bright with opportunity and achievement.



AGRICULTURAL ORGANISATION IN QUEENSLAND.

THE NEW COUNCIL OF AGRICULTURE.

THE QUEENSLAND FARMERS' CHARTER.

MINISTER'S INAUGURAL ADDRESS.

"No organisation has ever achieved anything in the realm of human activity without encountering difficulties, and the higher the objective the greater are the obstacles to be overcome . . . .

"I wish your new organisation every success. You are entirely on a commodity basis, and you have been given far-reaching powers under the Act just passed by Parliament—an Act which, to some extent, may be regarded as the Queensland Farmers' Charter."—*Hon. W. Forgan Smith.*

The first meeting of the newly constituted Council of Agriculture was held at Brisbane on the 15th December, 1926, at which there was a full attendance of the elected representatives of the several commodity boards operating under the Primary Producers' Organisation and Marketing Act and related legislation. The Council is therefore completely representative of the working farmers of the State. The opening address was delivered by the Hon. W. Forgan Smith, Minister for Agriculture and Stock.

THE MINISTER'S ADDRESS.

Gentlemen, as Minister for Agriculture, I wish to welcome the new Council of Agriculture recently formed on the passing of the new Act which was approved by Parliament in the course of the last session. I regard, gentlemen, agricultural organisation of this nature as an evolutionary growth. One must realise that organisations of all kinds must keep developing and growing, and as you increase your sphere of activities it is necessary, on some occasions, to alter the basis of your organisation.

When the Government, first of all, set out with the launching of this scheme, it was necessary to provide the nucleus of an organisation, so that ultimately the objective of the control of agricultural industries being placed in the hands of those directly concerned might be achieved, and as a result of that we are glad at the present day to form a new Council of Agriculture elected on a commodity basis and representative of far the greater portion of agricultural wealth now produced in Queensland.

Something Worth While Achieved.

On the inception of this movement there were a number of people opposed to any form of organisation. There was another section of the community who realised that while organisation itself was good, they feared that the scheme undertaken was too ambitious. With regard to that point of view, I do not think that any reasonable body of men could have too ambitious a project. No organisation has ever achieved anything in the realm of human activity without first encountering difficulties, and the higher the objective the greater are the obstacles to be overcome. I think everyone to-day who takes an impartial view of agricultural organisation in Queensland will realise that something well worth while has been achieved. I believe that this organisation has been of considerable value to the farmers of Queensland, and through them to the State. I believe that the organisation has been justified from every point of view, and I look to a greater sphere of activity and usefulness in the years to come. You have had some difficulties to encounter; but, as I remarked earlier, those difficulties are only there to be overcome, but with intelligence and loyalty to the organisation, you will go on improving your position.

The Problem of Finance.

One of the greatest problems you are faced with in connection with organised marketing is in regard to the financing of your various projects. The pool boards that have been established have been financed by the Government in various ways, chiefly by means of a guarantee. I have always taken the view, as most of you gentlemen know, that the security of the commodity itself which a pool board is in a position to give is sufficient security for any financial institution without the backing of a Government guarantee. It is, in my opinion, a wrong thing for a financial institution to insist on that form of Government guarantee, because it means that any risk involved in the transaction is borne by the Government and any profit is taken by the private financial institution. They are playing, in effect, with a double-headed penny. That is something that we have to consider. We have to apply our mind to improving that position and endeavour to devise a method whereby pool boards and organised marketing bodies will be able to secure their necessary finance as a matter of course, without recourse to artificial aids and Government guarantees. However, it is well for me to make this point, which is indicative of the general success of the work of pool boards, that not one penny of any guarantee has ever been called up. In other words, the pool boards have carried out their affairs in such a way as to meet all their obligations, and the Government has never lost a penny in any respect by means of guaranteeing these pool boards. That indicates a high degree of business acumen on the part of those responsible for the working of these boards, and the security itself should be sufficient for the financial institution without the backing of a guarantee. I mention this phase, not that there is any likelihood of any change in the attitude of the Government I represent in that matter. We are prepared to assist your projects in every way, but I realise, having the best interests of agricultural organisation at heart, that the sooner you are in the position to arrange your own finances with financial institutions, without the backing of any Government, the stronger your position is bound to become.

Suppose you continued working on the basis of a Government guarantee, and any change in any policy took place, say, in the Government refusing to make those guarantees available, then the pool boards would be in a very difficult position, if they were able to carry on at all. I mention that because I believe in the permanency of such organisations, and we must put them on a basis, financial and otherwise, so that their continuance and continued usefulness should not be liable to suffer, due to any change of policy that may eventuate in any future years. In other words, it is a good thing to become an independent organisation acting on your own behalf, without the necessity of seeking assistance from outside bodies in any way.

I have been in touch with the Commonwealth Bank in this matter for some time past. You may remember that at a meeting of interstate Ministers in Brisbane, this matter was fully discussed. The Government of other States—Victoria, South Australia, and to some extent New South Wales—had been confronted with some of the same difficulties, and as a result we have made joint representations to the Commonwealth Government to give effect to the principles contained in the Rural Credits Act. So far as it has gone up to the present time, that Bill has not been given an opportunity to function in the manner it was intended to function by the Parliament which passed it. In other words, asking for a guarantee in the manner I have described is not in accordance with any proper scheme of rural credit as I understand it.

The Wheat Board Guarantee.

The latest point I have got to is in regard to a letter I received, having reference to the Wheat Board's guarantee. The Treasurer has found it necessary this year to again sign a guarantee on behalf of the Wheat Board with the Commonwealth Bank. The bank takes the view that the Wheat Act and the Primary Producers' Organisation and Marketing Act of itself does not give them what they call "legal control" over the commodity, and they have suggested that we amend the Wheat Pool Act, and presumably also the other Act, provided that where a pool board has been formed they be given legal ownership in the commodity by those who have grown it. As you all know, gentlemen, that raises a very controversial subject. It raises a very serious matter also on the part of the farmers themselves. While many farmers may be prepared to vote for the formation of a pool, it requires deeper consideration before handing over complete legal control of the commodity. We contend that the provisions contained in the two Acts I have mentioned are ample to give sufficient security to any financial institution operating in this way. As a matter of fact, one of the private banks other than the Commonwealth has already financed the Atherton Maize Board, and if their security is good enough that should apply to the Commonwealth Bank's Rural Credits Department and any other financial institution. However, I do not propose to let the matter end there, and I look to your new Council to take an active part in studying this question, with a view to arriving

at a basis whereby pool boards will be enabled to obtain their necessary finance through the ordinary channels available to any other trading organisation. Agriculturists during the past year have been having a very bad time. There is no doubt that the drought which we are enduring and have endured during the past few months has caused untold suffering to those engaged in primary producing work. It will take a considerable time for the State to recover from the losses sustained. In my position, as Minister for Agriculture, I come in close contact with the people on the land, and can appraise perhaps better than most the losses that have been sustained and the suffering that has been endured. However, I hope, ere long, that the disastrous drought will break and the ensuing year will bring in a return of prosperity and good seasons which are necessary to place everyone on their feet again.* It will be one of your functions to study drought problems, consider whether insurance can be made to provide against drought losses, and what steps should be taken to make the losses from recurrent droughts less disastrous.

The Queensland Farmers' Charter.

Now I wish your new organisation every success. You are entirely on a commodity basis, and you have been given far-reaching powers under the Act which has just been passed by Parliament, which may be to some extent regarded as the Queensland Farmers' Charter. Under that Act you will be able to accomplish a great deal. I keep in close touch with the various forms of legislation passed throughout the world dealing with agriculture, and I can confidently assert that this Bill gives the farmers of Queensland more power into their own hands than has been given to any other country of the world. Of course, no one can accomplish miracles. There is no Messiah in Queensland in the agricultural industry who can accomplish or perform miracles on your behalf, but you have been given machinery which, if used wisely and intelligently, will do much to improve your position. Careful thought and intelligent consideration to all those problems, complete loyalty to the various organisations that are built up, are the essentials necessary for success.

The Queensland Farmers' Opportunities.

I wish you every prosperity in the new year. I hope that your organisation will continue to develop and prosper, and I believe that, operating as it will through the channels of this new Council and through the various marketing boards that have been established, a new lease of activity will be given to the organisation and much benefit will result therefrom.

As far as I am aware, the relations between the Council of Agriculture and the Department have always been of a most cordial character. I am satisfied that they will continue to be so, and, with the various organisations working in harmony one with the other, Queensland's agriculturists have opportunities unsurpassed in any other State of the Commonwealth.

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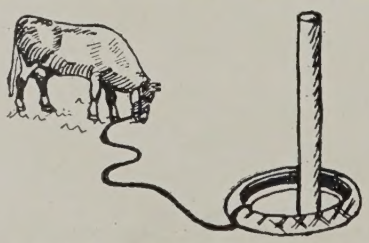
*[Copious and continued, and in some localities torrential, rains have since fallen over most of the agricultural areas of Queensland.—ED.]

TETHERING COWS.

Tying and untying the tether rope is rather troublesome, and can be eliminated by using the method shown in the illustration. The rope is tied to an old motor-tyre casing which is simply thrown over one of several posts driven into the ground in the



grazing field. Another advantage of using this method is that the casing will roll around the post, preventing the rope from winding around the pole and thus bringing the cow close to it and decreasing her grazing area.—"Popular Mechanics."

THE COUNCIL OF AGRICULTURE.

THE MINISTER ELECTED PRESIDENT.

One of the first matters considered by the newly constituted Council of Agriculture was the appointment of a President of the Queensland Producers' Association, of which the Council is the executive. It was the unanimous desire of the Council, representative of the several Commodity Boards, and therefore of every section of the agricultural industry, that the presidential chair should be occupied by the Minister for Agriculture and Stock, Hon. W. Forgan Smith. Messrs. George Johnson and H. Keefer were deputed to convey that desire to the Minister and request his acceptance of the position. Subjoined is a full report of the deputation.

SUBJECT: The preferring of a request from the Council of Agriculture that the Minister should accept the position of President of the newly constituted Council of Agriculture.

Mr. JOHNSON: Mr. Keefer and myself have been deputed by the Council of Agriculture to approach you with a view to attaining your consent to your acceptance of the position of President of the Queensland Agricultural Council. I might say that it is a pleasure, both to Mr. Keefer and myself, that we have been asked to come along with this request, and also to think that we have behind us every member of the Council in the matter. We feel sure that you will give it sympathetic consideration. I believe that you will agree with us that it is of mutual advantage that you should hold the position of Chairman of the Council, as I think it will be of benefit to you to get the first-hand views of the representatives of the various industries on the different problems which confront us. It gives us an insight into your problems —which are our problems—and we get a better knowledge of one another. We know that you are sympathetic, and that during the time you have held the office of President it could not have been better filled, either in the manner in which the business was conducted or otherwise. On behalf of the Council I have to ask that you will be so good as to accept the position of President of the Council of Agriculture.

Mr. KEEFER: I would like to endorse the remarks of Mr. Johnson. I fully realise that the very sympathetic treatment which the various commodity boards have had in the past has been due, to a considerable extent, to the fact that the Minister for Agriculture for the time being presided at the meetings, which gave him an opportunity which he probably could not have otherwise had of getting into touch with the various problems and difficulties and trials of the man on the land. I recognise that we have had the most sympathetic treatment possible from this Government since the organisation was brought into existence—or since pooling was brought into being. I happened to be in the position of being connected with the two first pools which were brought into existence prior to the Agricultural Council, and I realise that, had it not been for the sympathetic treatment and kindly consideration of the Minister for Agriculture of the Government of that time, we could not have inaugurated those pools and carried them on as we have done. I am sure that it will be to our interests if you accept the position of President of the Council of Agriculture, and preside as often as you possibly can at our meetings, and thus get in touch with all our difficulties. I hope you will see your way to accept the position.

THE MINISTER'S REPLY.

THE MINISTER: I wish to say that I feel honoured at your request. I feel it to be a distinct honour to be requested by a body representative of all the agriculturists of Queensland to be the President of what might be termed their "National Executive." I have followed the work of the Council of Agriculture and the various commodity boards right from the inception of the movement, and I believe that the

association of the various organisations with the Government, as was pointed out by the deputation, has been of mutual advantage. By the intelligent co-operation of the Department of Agriculture with the various commodity boards and the Council of Agriculture good results can be achieved, and there is no doubt that the Minister having the opportunity of hearing the discussions on any project and being present at such gatherings enables a better understanding to exist between us, and enables the Government to realise more clearly the problems confronting the farming industry, and to realise also the direction in which the Department could help the agriculturists. I believe that agriculture in Queensland requires all the aid that the Government can give it—that form of national help which is conducive to national well-being. By help from the Government I mean that form of aid which will enable the agriculturists to obtain more advantage through their own efforts and activities, and not that form of assistance which in the last analysis brings about a form of State mendicancy. We have been able during the period to accomplish good work for the agriculturists of Queensland, and the reorganisation will result in greater efforts being made and in greater achievements being accomplished. At the present time the farmers of this State are going through a very trying and difficult period. The seasons are adverse, and considerable losses have resulted throughout the State which will have a far-reaching effect for a long time to come. These conditions will not always remain, and the Council of Agriculture, in conjunction with the Agricultural Department, will have to apply itself with renewed energy to the solution of those problems.

An Agricultural Survey.

I have been engaged during the past few weeks in considering a question which more directly affects agriculture. We can produce in Queensland very many commodities in plenty, but in some cases we are producing for an already overstocked market, and the farmer cannot be expected to produce for a market which will not give him an adequate return for his labour. I have also taken out figures showing those commodities which can be grown successfully in Queensland, and for which there is a greater demand than supply. It is the Government's intention to encourage and develop the production of those commodities which will find a ready market in Queensland and Australia, and with that end in view the Cabinet has approved of a scheme to make a complete agricultural survey of the State. At the present time we know that certain things can be grown, but we want to be in the position to know where those commodities can be grown commercially, and where the best results will be given to those who embark in those industries. Take, for example, the North. There we have the problem of the sugar industry, which cannot be extended to any great extent owing to the over-production already, yet much fertile land exists. We have the land available, and we want to consider the best crops to grow in those areas which cannot be given a permit for the growing of sugar-cane. The same necessity for a survey exists in other portions of the State. A committee will be formed to carry out a complete agricultural survey of Queensland, commencing chiefly in the North. Men capable of carrying out that work will be appointed, and I look to the Council of Agriculture to aid that committee of economists in every possible way. I mention that matter to show where the co-operation between the Council and the Department will be to some considerable advantage.

Provision was made under the new Act for the Council of Agriculture to have the right to elect its own Chairman. I considered that it was not proper for the Government to insist on any of its nominees holding administrative positions, and believed that the time had come to leave the Council untrammelled in its choice as to who should be its President.

Mr. JOHNSON: We have exercised that right.

The MINISTER: While I have quite a lot of other work to do, I think the importance of the matter is so great that I will be pleased to comply with your request, and accept the honour you have conferred upon me.

The deputation thanked the Minister for his favourable consideration of their request, and then withdrew.

Bureau of Sugar Experiment Stations.

FIELD REPORTS.

Mr. A. P. Gibson, the Northern Field Assistant, reports (6th December, 1926) :—

Innisfail District.

Weather.—The weather is hot, dry, and dusty. Storms have appeared and disappeared without much relief.

Rainfall.—Monthly rainfall since June:—June, 4.24; July, 2.69; August, 5.38; September, 13.11; October, .9; to 19th November, 1.05; total 26.56; and for the year, 87.27 inches.

The Crop.—The end of the 1926 crop is in sight. Mourilyan Mill has already finished its second greatest crop. The continuous wall of standing cane of a few months ago has almost vanished, and in its stead remain small somewhat-scattered patches. The unusually long spell of dry mid-seasonal weather had a bad effect on the general crop growth, therefore many mill estimates were temporarily reduced, but the fine widespread rains of September brought them up again. This unexpected yet welcome fall caused quite a transformation; it slightly delayed harvesting, but promoted wonderfully the new crop growth, especially that of the very late cut cane. The total tonnage of cane likely to be crushed from the eight most northerly mills should yield slightly over one-half of Australia's present sugar requirements. The local mills, with the exception of the South Johnstone, are treating crops in excess of those expected prior to receiving the September rains. Last year the South Johnstone area yielded about 23 tons per acre; this season it is likely to be about 4 tons less. Work in field, mill, and transport had progressed uninterruptedly. Inadequate shipping space to meet the ever-increasing daily quantity of sugar manufactured has caused an accumulation of some 3,000 tons at Mourilyan. Compulsory stacking entails much unnecessary expense and possible losses, due to depreciation, all of which must be added to the cost of production. The watersiders' overtime strike is having a bad effect on the industry. It has disorganised and considerably reduced the running of big and small coastal freighters, thus slowing down the removal of sugar and other perishable goods. The mill has worked well and smoothly. Mourilyan, especially, had a particularly fine run, perhaps the best since its inception, treating some 135,000 tons in good time. The mill has averaged 5,500 tons a week (working week 44 hours) with a 14.38 sugar percentage. Over 97 per cent. of the crop milled was Badila.

Harvesting.—This had proceeded satisfactorily. Some exceptionally fine crops of Badila had been removed off the richer river-bank deposits. The cane was weighing surprisingly well. Arrowing and top rot had occasioned much stem sprouting, thus making harvesting more difficult and having the tendency of slightly lowering the extraordinarily high prevailing c.c.s. It was pleasing to note the very clean state of cane coming forward for milling at Goondi.

Cultivation.—Growers are taking full advantage of the present dry weather, and field work is being performed under perfect conditions. The economy practised by some growers is impressive, but generally there is much room for improvement. Farmers do not protect their valuable implements to the extent they should. Now is the time to conserve moisture and control the weed growth in field and headlands by the judicious mulching of surface soil, thereby encouraging speedy growth, when the foliage will quickly cover the bare spaces between cane rows, thus reducing the ground exposed to the fierce summer sun and drying winds. The great importance of cleaning up and destroying tops, dead cane, or exhausted stubble cannot be too strongly emphasised.

Ratooning.—This important work is often delayed. It should be performed as soon as practicable. The rotary cultivator is becoming popular, and where used is speeding up this class of work. The depth to which it operates entirely depends on the physical condition of the soil. The continuous September rains, followed by a hot dry month, made some fields most refractory, and, when subsequently tilled, the soil turned up in great lumps.

Cane Trash.—As much of that as possible raised from a soil should be returned to it. It is correct agriculture to plough in crop residues immediately after harvesting, the greener the better, for then will decomposition be speedier, especially in a moist and humid climate. As yet we have no machine that can successfully

do this very necessary work and save the high annual plant food losses and free the ground surface of encumbrances, and so the least line of resistance is followed—that is, burning. Agriculturally speaking, that is wrong. However, from a pest and disease point of view it may sometimes be desirable to burn the trash after each cutting.

The following benefits result from the conservation of trash:—

(1) Plant foods, mainly nitrogen, are saved, but when the trash is left on the surface to decompose much of the nitrogen is lost in the atmosphere;
(2) A mulch is formed which assists the conservation of moisture and retards weed growth;
(3) Cultivation is reduced;
(4) The leaching of plant foods and the washing away of fine soil are minimised during periods of excessive wetness.

The benefits of burning trash are—

(1) A vast number of pests and diseases are destroyed;
(2) The risk of fire is less, and the area is freed of rubbish, thus permitting superior cultivation and soil aeration.

Manuring.—The C.S.R. Company adopt the draught-board pattern of manuring on the various types of local soils. This method entails more work, but is satisfactory. Queensland sugar soils generally are most deficient in organic matter, such a condition probably being the result of always burning crop residues. Our farmers are doing little towards restoring this highly important soil constituent. Some growers prefer applying mixed fertilisers to centre of crop interspaces, for it is considered the root system is attracted thereto, thus offering a greater root anchorage and a larger feeding area. It must not be forgotten, however, that subsequent necessary intertillage frequently severs this surface-rooting system. Accumulated experience rather favours depositing such mixture adjacent to both sides of the stool where the roots immediately assimilate it, thus promoting early crop growth.

Molasses.—When we consider that about 80 lb. of potash are lost in every ton of molasses, and that our voolcanic red soils are mostly deficient in this constituent, it is to be wondered why some of our progressive and hardy farmers do not experiment with this waste, a product mainly removed from the ground.

Planting.—A big area, mostly Badila, has been planted. Germination has varied all the way from poor to exceptionally good, with sets just bursting through the soil to well-established stools. The dry condition had permitted improved tilling. Cane planted about September, the wet month, germinated erratically, and the soil appeared refractory.

Pests.—Injuring foliage—Army worms, *Aphis sacchari,* and rats eating portion of midrib of young ratoons in a small way;

Shoot Killers—The larvæ of the tineid, big moth and weevil borer, and *Pentodon Australis* (black beetle);

Stem Destroyers—Rats and weevil borers. Greybacks have been on the wing off and on since the 5th October, but no great flight has yet been noted; possibly they are soil bound. A good fall of rain may permit their emergence. Three tachinid-fly cages have been built in the South Johnstone area; so far they have not been very successful in breeding the fly. *Pentodon Australis* has been located injuring primary shoots of plant cane in the local mill areas, mainly in newly broken-up grass lands planted to cane. Some half-inch holes are made in shoots, thus severing the base of the arrow or heart above the mother plant. Such destruction is generally put down to grub or mechanical injury.

Diseases.—Leaf scald, top rot, and red rot. The two first-mentioned are prevalent, and it is rather difficult to find a farm totally free from these. Where diseased canes have been planted the resulting crop speaks for itself. Innisfail Estate, a fairly level, fine, brown to red fertile area of alluvial land almost surrounded by the North Johnstone River and the united waters of this and the Southern branch of the main Johnstone River, was in the early days the home of a pioneer mill. This fine bit of country is not directly connected to the factory by a railroad; the crop, however, is brought forward on trucks over portable rails, and on a big punt capable of carrying ten trucks of cane every trip over the river to the point of delivery. The 1927 seasonal prospects at present are promising. The September rains had worked wonders with the new crop, and the old crop would be finished in good time, thus permitting a longer growing period. The weather, however, is again dry, and some of the older and early cut ratoons are beginning to show signs of distress.

PURE SEEDS, STOCK FOODS, FERTILISERS, AND PEST DESTROYERS.

By FRED. F. COLEMAN, Officer in Charge, Seeds, Stock Foods, Fertilisers, and Pest Destroyers Investigation Branch.*

Seeds Suitable for Market Gardeners.

The ever-growing demand for such vegetables as cabbage, cauliflower, carrot, beet, onion, turnip, and tomato has directed many growers' attention to the necessity of sowing the varieties most suitable for market requirements. In the past little attention has been given to strains, the usual idea being that identical crops would be produced from any kind of cabbage, cauliflower, &c., and the buyers' principal aim was the price of the seed.

Seedsmen obtain their supplies from many countries. As every exporting country has a number of merchants doing an oversea trade, it follows that because A and B purchase cabbage seed from, say, the United States of America, it is more than probable that their supplies come from different merchants. Assuming both importers purchase cabbage under the same variety name, it is still possible for the seeds to be of different strains of the particular kind of cabbage invoiced.

New seeds of cabbage, beet, cucumber, cauliflower, tomato, turnip, and even carrot will easily retain their germination for a year if kept in a cool dry place. Market growers would, therefore, be well advised to purchase their requirements of cabbage, cucumber, tomato, &c., a year in advance and make a trial of each lot by putting a row alongside the main crop. If the seed proves to be the strain best suited for market requirements they have enough on hand for their next year's main crop. If unsatisfactory their loss is little more than the cost of the seed.

When buying it is well to ascertain the seedsman's stock number, and any other particulars regarding the strain purchased. This will enable the seedsman to supply the buyer's future requirements with seed from the same source. When a good source of supply has been found it is obvious that the buyer should again obtain supplies from the same merchant, as the buying of supplies from casual vendors of seed in most cases leads to monetary loss in the resulting crop.

Vegetable Seeds in Pictorial Packets.

Sixty-three samples of seeds in pictorial packets were examined; the goods in question were offered for sale by shopkeepers who had obtained their supplies from what can best be described as itinerant dealers in seeds.

From the samples examined it appears that the packers had in many instances put prickly spinach into cabbage packets, turnip into packets marked "celery," also turnip into cauliflower packets. Many of the seeds were of poor germination, some as low as 20 per cent., and in a few cases even less. As a result of investigations, several thousand packets were destroyed by various vendors, who it appeared had paid cash for the goods on or before delivery.

Unfortunately the small traders selling these lines are absolutely without knowledge of seeds; further, they neglected the ordinary business precautions when purchasing goods from an unknown source, with the result that they not only lost more money than they could well afford but at the same time raised a considerable number of irate customers. If small shopkeepers must sell seeds, they should at least obtain their supplies from seed merchants of repute; and the general body of amateurs would also be well advised to obtain their supplies from legitimate seedsmen, or as an alternative from those storekeepers who sell pictorial packets bearing the names of merchants of good standing.

Agricultural Seeds.

Although nearly everyone will agree that better seeds means better crops, it must not be overlooked that better cultivation means better seeds. On reference to Table I. it will be noted that, in many cases, samples of canary, prairie grass, *Setaria italica*, Japanese millet, Sudan grass, barley, and lucerne contained seeds of the poisonous thorn apple (*Datura* sp.); several samples of lucerne contained seeds of dodder (*Cuscuta* sp.); about one-third of the cowpea samples were infested with the cowpea weevil (*Bruchus* sp.).

* In the Annual Report, Department of Agriculture and Stock, 1926.

The general body of merchants cannot be held to blame for these occurrences; the producer of the crop must know of the presence of such weeds as thorn apple and dodder, which should be eradicated from all crops, whether intended for seed or for use as feed.

With the cowpea weevil (*Bruchus* sp.), it is possible for it to be kept under control by the fumigation of the seed as soon as possible after threshing, and then storing it in an insect-proof container, such as a tank, otherwise stray insects will lay their eggs on the cowpeas, making a further fumigation necessary. From experiments made with cowpeas during 1925-26 it appears that 4 oz. of bisulphide of carbon is sufficient for 100 cubic feet of chamber space.

The round tanks usually sold as 500-gallon tanks, measuring about 4 feet in diameter with a height of 6 feet, with a capacity of about 75 cubic feet, would require 3 fluid oz. of bisulphide of carbon. To get the best results the tank should be filled with cowpeas, and some cotton waste placed near the opening, the quantity of bisulphide of carbon required being poured on the cotton waste and the tank quickly closed with an air-tight lid. The seed should remain in the tank (which must be airtight) not less than twenty-four hours or longer than thirty hours. The cowpeas should then be taken out of the tank and bagged for immediate despatch to a merchant, or stored in an insect-proof, airtight container, free from bisulphide of carbon.

In our report for 1924 reference was made to the increasing number of lucerne seed samples that had been attacked by the lucerne seed wasp (*Bruchophagus funebris*). At the time it was suggested that farmers would be well advised not to save any seed from infested paddocks, and to cut the crop before the seed had ripened, or utilise it as green feed. During 1925-26 several merchants found it necessary to fumigate their lucerne seed in the manner described for cowpeas, also to heavily machine-clean the bulks, and at our suggestion burn all the cleanings.

Whatever a merchant may do to bring a sample of lucerne seed up to the requirements of the Seeds Acts, it should not be overlooked that effective control of the pest must be on the farm. When lucerne seed is thrashed a quantity of debris is always left. As this material often contains a large number of broken pods containing seeds infested with the hibernating larvæ, it is obvious that such debris should be burnt, and a general clean-up made before the warm weather sets in.

Bisulphide of Carbon.

Users of bisulphide of carbon have been repeatedly warned of the danger of explosion when a naked light is brought near air charged with its fumes. As a precaution against such an occurrence it is advisable to place the fumigation tanks in a position that does not exclude daylight. Further, it must not be overlooked that, when the fumes of bisulphide of carbon are present in the fumigation chamber for a longer period than is suggested, the germination of the seed may be adversely affected. With seed stored for any length of time the loss of germination will be particularly noticeable. This loss will not occur if the fumigant is used in the manner recommended.

Good Seed.

Seed to be good must have a high germinating capacity, be true to variety name, and free from weed seeds, inert matter, and diseased or insect-infested seeds. No matter how careful the grower may be, all crops will contain some plants other than the ones which it is intended to produce. A cleaning machine should therefore be used before the seed is offered for sale. In Queensland, as in every part of the world, the most critical buyers will be found in the merchants with efficient cleaning machinery.

An up-to-date seed-cleaning plant can make good samples of "As grown seeds" better, but it cannot make bad samples good. With a full knowledge of their machinery possibilities, most merchants are willing to buy on a clean seed basis; they are not, however, inclined to purchase poor samples, and the usual market for seeds of indifferent quality is with dealers who have little appreciation of impurities. The actual seed user who insists on buying his supply on a price rather than a quality basis encourages the vendors of goods of inferior quality. Unfortunately, seeds of indifferent quality usually carry a large profit to the seller.

Good seeds cost money to produce and money to clean, and the general improvement of farm seeds rests largely on the farmers themselves. When practically every

farmer insists on a high-grade product, the demand for poor-quality seeds will cease, and those unfit for sale as seed for sowing will disappear from the market.

It cannot be too widely known that samples representing seeds purchased by farmers for their own sowing are examined at the Seed Laboratory free of charge. During the year only twenty-seven farmers availed themselves of this opportunity. Although buyers are able to form a good idea as to the market values or prices of produce, experience shows that they are frequently misled as to the purity and germination of seeds. The time to ascertain this is before sowing; samples should be drawn from the goods actually delivered and in the buyer's possession, care being taken to make them truly representative of the bulk. One little matter is most important—the name and address of the sender should be written in ink on every sample.

Stock Foods.

Owing to sub-normal seasonal conditions in the Western areas there has been a greatly increased demand for concentrated stock foods, and many inquiries have been made for a concentrate suitable for feeding to sheep. However good the concentrate suitable for this purpose may be, sheep still require a sufficiency of roughage. It must also be borne in mind that maize is not high in protein. Some samples representing large quantities sent to the Western districts had a crude protein content of less than 9 per cent., and contained a quantity of damaged and mouldy grain.

In the production of stock foods in cube form, manufacturers often use a proportion of molasses in order that the ingredients may adhere and take the desired shape. Owing to long transit from the place of manufacture, in some instances a considerable proportion of this material has arrived in more or less a powder form, therefore not so suitable for feeding to sheep as would be foods arriving in an unbroken condition. Further, it has been noticed that molasses is apt to make the feed mouldy when stored for any length of time. This condition, however, has not been noticed in stock foods obtained fresh from the manufacturer.

Barley meal appears to be coming into favour as a food for pigs. The regulations under the Stock Foods Act define meal as the clean, sound, ground grain or finely crushed product of the entire grain cereal, or seed of which such meal purports to be made. Recently, several samples of barley were submitted for examination; most of them were badly smut-infested, and merchants have been warned that the making of meal from such material would render them liable to proceedings. A linseed oil meal manufactured by the new process is now on the market. As would be expected, the meal in question contains less than 1 per cent. of crude fat and more crude fibre than the ordinary linseed oil meals.

The large quantities of foxtail millet (*Setaria italica*) and Japanese millet seeds held by many produce merchants during the early part of the year induced several of them to make millet seed meals. Samples of the meals in question were analysed by the Agricultural Chemist, and the average results tabulated.

For the information of several large produce merchants, samples of prime lucerne chaff, ordinary lucerne chaff, wheaten hay chaff, also wheat, barley, and oat straw, were analysed, and the figures given will be useful for the future guidance of both buyers and sellers, who often hold quite erroneous opinions as to the feeding value of straw as compared with lucerne hay. The Stock Foods Act defines chaff as being hay or straw cut into short lengths, and hay as any dried or cured cereal, grass, or legumes, cut *before complete ripeness*, and from which the grain or seed has not been removed; straw being defined as any dried *ripe or mature* cereal grass or legume from which seed or grain has been removed by any process or by an insect or by storm.

Unfortunately, chaffing of lucerne hay makes the selling of inferior lucerne possible, as the buyer has difficulty in the detection of weeds and other foreign material frequently therein.

Last January, several complaints were made by merchants regarding the quality of a lucerne hay received from some of their sending stations. In the first place the battens ranged in weight from just over 3 lb. to just under 9 lb. each, and the material was badly infested with *Xanthium spinosum* (Bathurst burr). Several bales from these consignments were carefully examined. One contained just over 84 per cent. of lucerne hay and grasses, 13.8 per cent. of Buthurst burr, and 1.25 per cent. of other bad weeds. Another bale, representing goods purchased by a large baker in the Paddington district, contained 5.4 per cent. of Bathurst burr, and 8.3

per cent. of other bad weeds, dirt, roots, &c. The total weight of the battens on this bale was just over 60 lb., nearly 9 lb. each. A sample of lucerne chaff submitted for examination by Chief Inspector of Stock contained over 2 per cent. of Datura seeds and capsules. The sample in question represented a line of fifty-three bags delivered by a farmer of the Kingsthorpe district to a Toowoomba merchant. An official sample taken on the merchant's premises was carefully examined, and found to consist of 90.47 per cent. of lucerne and useful plants, just over 2.3 per cent. of Datura seeds and capsules, 4.8 per cent. of weed seeds principally *Tribulus terrestris* (bull's head) and *Hibiscus trionum*; the remainder of the sample consisted of soil.

As a result of these investigations, several lots of so-called lucerne chaff and hay were destroyed by the owners on account of the material being deleterious to the life and health of stock.

In consequence of these findings and at the request of the Brisbane Produce Merchants' Association, a lecture was given early in June on weeds and other substances found in hay and chaff, and known to be deleterious to the life and health of stock. The merchants attending this lecture were each given specimens of Datura seeds and capsules, and similar specimens put up in sealed bottles have since been distributed to the principal merchants in the Toowoomba, Warwick, and Kingaroy districts. For the information of both buyers and sellers, paragraphs have appeared in the papers published in the areas referred to, and specimens of Datura can now be seen at the offices of the respective papers. Further specimens are available for distribution to persons interested in the production or sale of produce likely to contain plants or seeds deleterious to the life and health of stock.

In June, 1924, several large users of maize consulted us regarding the commercial possibilities of maize storage. At the time a satisfactory method of examination had not been worked out, too much reliance being placed on the grains being free from external insects. Several of these buyers who were interested in maize for feeding to horses submitted samples of different lines then offered for sale at Roma street; and, acting under our advice, purchased samples with a heavy volume weight, free from (external) live insects, with a moisture content of less than 14 per cent., samples containing a number of live insects or otherwise of obviously poor quality being rejected. A sample from each of the lots purchased was kept at the Laboratory. As soon as the hot weather set in, the samples in question were found to be badly insect-infested, in spite of the fact that they were free from external insects when put into airtight containers.

The buyers of the maize in question were recommended to fumigate with bisulphide of carbon on delivery and then store in airtight tanks. One large firm of carriers carefully followed our suggestions and did not open the tanks until after fifteen months' storage. The maize came out in excellent condition, and they were able, after retaining a sufficient quantity for their ordinary requirements, to sell the remainder at the highest then ruling prices.

When the tanks were opened the maize was sampled and the grain examined by the methods now adopted. As anticipated, the grain contained traces of insects in developmental stages; these, however, had been killed by the 1924 fumigation.

Fertilisers.

Until quite recently the sale of fertilisers in Queensland appears to have been confined to the canegrowers and to such areas as Nambour, Redland Bay, Stanthorpe, &c. During the year under review no less than ninety-nine persons applied for licenses to sell fertilisers, many in districts from which hitherto there has been no demand. The reason for the great increase in the number of fertiliser dealers is probably due to inquiries made of country storekeepers for fertilisers suitable for the top-dressing of both lucerne and grass land. It is known that the use during the last three years of a few bags of fertiliser has now resulted in the selling of both super. and mixed fertilisers in quantities undreamt of two years ago.

A large lucerne grower who recently consulted us regarding the purchase of seed stated that he was this year buying several tons of fertiliser, as his experience during the last three years had convinced him that the top-dressing of lucerne pays; the increased crops had fully satisfied him that his failures, if any, were in the application of too small quantities. Another grower some five years since applied super. at the rate of 1 cwt. per acre to a lucerne paddock now ten years old. Since the first year of application he has been using 2 cwt. per acre, and is convinced that he has more than doubled his crop.

In favourable years Nature is such an ample provider of grass of sorts—and carries on so unaided in its production—that stock raisers are apt to regard grass

with indifference, probably for the reason that it is the only crop that gives something for nothing. The something, however, is often of low feeding value; this is particularly noticeable at the present time, with the result that many landowners are now purchasing considerable quantities of super., finely-ground Nauru phosphate, and bonemeal for the top-dressing of large areas, and present indications point to a large and increasing demand in Queensland for fertilisers suitable for the purpose referred to.

For the information of large buyers a formula table was issued with last year's Annual Report. As inquiries are from time to time received for such a table, reprints were made and are now available for distribution. The raw materials available are as follows:—

Containing nitrogen only—

Sulphate of ammonia,

Nitrate of soda,

Dried blood.

Containing both nitrogen and phosphoric acid—

Bone meal or dust,

Bone, flesh, and offal fertilisers.

Containing phosphoric acid only—

Nauru or Ocean Island phosphate, superphosphate, basic super., basic slag.

Containing potash only—

Sulphate of potash,

Muriate of potash.

Pest Destroyers.

It is frequently overlooked that the Pest Destroyers Act applies to such articles as arsenate of lead, arsenic, calcium cyanide, cattle dips, copper soda, copper carbonate, copper sulphate, cyanide of sodium, cyanide of potassium, formalin or formol, iron sulphate, lime sulphur, nicotine, nicotine compounds, phenolic insecticides, germicides and disinfectants, phosphorous pest destroyers, pyrethrum (or insect powder), prickly-pear poisons, arsenical weed destroyers, insecticides, red oil preparations, sheep dips, strychnine, sulphur, tobacco dust, tobacco powder; also, any insecticide, fungicide, vermin destroyer, or weed destroyer not elsewhere included.

For the protection of the user, every dealer is required to label each package of pest destroyer in such a manner as to give the following particulars:—

1. The distinctive name of the pest destroyer.
2. The net weight contained in the package or, in the case of liquids, the true volume content expressed in imperial gallons or fractional parts thereof.
3. The names of the active constituents, and, when so required by the prescribed standards, the percentage of such active constituents and/or the impurities contained therein.
4. All directions for use of the pest destroyer.
5. The name and address of the Queensland wholesale dealer.

On the purchase of any pest destroyer of a greater value than 5s. the buyer should receive from the dealer a signed invoice setting out—

1. The name of the pest destroyer;
2. The net weight or imperial measure;
3. A warranty to the following effect:—

> Notwithstanding any agreement to the contrary, this invoice shall be deemed to be and shall have effect as a warranty by me, the seller, that the constituents of the pest destroyer sold, and the percentage in which each constituent is contained therein and the percentage of each constituent contained in that part thereof which is soluble in cold water, accurately correspond with the constituents and percentages respectively stated in the statutory declaration furnished to the Under Secretary, Department of Agriculture and Stock, Brisbane, as prescribed with respect to the pest destroyer of the same name by "*The Pest Destroyers Act of* 1923."

FRUITGROWING IN QUEENSLAND.

A GENERAL REVIEW.

By ALBERT H. BENSON, Director of Fruit Culture.*

The year ending 30th June has not on the whole been a satisfactory one for Queensland fruitgrowers, as the rainfall in the principal fruitgrowing districts has been deficient at those periods of the year when it was most badly needed, though ample during the latter part of last winter and autumn. Insufficient rain fell during the spring, and although there were fair rains in December, yet the long, dry, hot spell experienced during January and February and March retarded the growth of bananas, citrus, and other fruits, as well as of all kinds of vegetables. Since the recent rains, however, banana plantations have improved somewhat, but have not made up the leeway due to their lack of growth during what should have been their most active growing period. Citrus trees, have, however, made a good recovery, and vegetables of excellent quality are now being marketed in large quantities.

Pineapples have not suffered to any great extent, and, thanks to the improved marketing conditions relating to this fruit, growers have received better returns, and the industry generally is on a more satisfactory basis, both as regards the market for fresh fruit and the canned product.

The Stanthorpe fruitgrowers have had a fairly good year, and there was less loss from fruit fly and other diseases, and satisfactory prices were obtained for for all good quality lines. Grape growers did well, as the hot dry summer was very favourable to this crop, which was of exceptionally good quality, very free from disease, and met with a ready sale, fancy lines realising a record price. I have never seen better grapes grown in this State than those produced during the past season, as, from the earliest coast-grown fruit to the latest ripening varieties of the Stanthorpe district, the crop, taken as a whole, was a very satisfactory one, and growers have done well.

Little damage was caused by hail or late frosts, but one particularly severe frost during last winter damaged bananas in several low-lying areas and checked the growth even where the temperature did not fall as low as freezing point, and heavy winter rains damaged the mandarin crop in some districts.

There was a considerable increase in the yield of custard apples, and a quantity of very fine fruit has been marketed; at the same time there has been far too much inferior, undersized, and immature fruit offered for sale at a low rate that has been anything but a credit to the producers. There is an increasing tendency to market immature fruit, both locally and in the Southern markets, pineapple growers being the worst offenders, as on several occasions immature pines totally unfit for human consumption have been offered for sale. The practice is a regrettable one, as nothing tends more to put a buyer off purchasing pineapples than to find that he has paid for an article that is not only inedible but actually dangerous to eat. Orange growers are nearly as bad, as they frequently market fruit containing as much acid as a lemon, and which is only fit for making an acid drink to be sweetened with sugar to taste.

Owing to a great scarcity of lemons in the autumn, and to the prevalence of influenza and dengue fever, there was a great demand for immature oranges for making cooling drinks, and much higher prices were obtained for the immature fruit than it would have realised had it been allowed to mature. This, however, is exceptional and should not be taken as a precedent, especially as the Southern States refuse to permit the sale of immature oranges or mandarins, and our growers have to comply with the maturity standards fixed in these States.

Improvement in Marketing Methods.

As a general rule there is an all-round improvement in the quality, packing, and get-up of the fruit offered for sale, both with respect to that locally grown as well as that imported from the Southern States; but there is still plenty of room for improvement, especially in grading, as there is frequently a great difference in the size of the individual fruits packed in the same case. This applies to both local and Southern grown apples and pears, and is frequently very noticeable in the case of bananas, where unfortunately the grade mark on the case cannot always be relied upon, and as a consequence Southern buyers have lost confidence in our fruit. In order to regain the confidence of our buyers, a minimum size of fruit that can be packed has been fixed in this State; and the States of New South

* In the Report of the Department of Agriculture and Stock, 1926.

Wales, Victoria, and South Australia, who take practically all our fruit that is sent South, have agreed to recognise the grade standard fixed by Queensland and not to permit the sale of any bananas that do not come up to such standard. This will have the effect of making our growers more careful in the class of fruit they pack, as once they find that undersized fruit will not be permitted to be sold, they will not attempt to send it, and the rubbish that now finds its way to the Southern markets and gives our Queensland-grown bananas a bad name will be cut out.

It is gratifying to know that the days of being able to dispose of inferior fruit are very rapidly drawing to an end, as with the very greatly increased production of all kinds of fruit within the Commonwealth there is very little demand for rubbish at any price; and the only chance a grower now has of making a success of fruitgrowing is to produce a high-class article and place it on the market in the best possible condition and in the most attractive form. This will mean the elimination of the careless and ignorant grower, who will not keep abreast of the time, as he will not be able to compete with the man who knows his work thoroughly and manages his business on sound business lines. The elimination of such growers will greatly benefit competent orchardists, as many of their orchards have been planted in unsuitable localities, with inferior varieties, and are so neglected that they are a serious menace to the adjoining properties, as they are simply a nursery for the breeding and dissemination of every kind of pest that fruit or fruit trees are subject to.

Unprofitable Orchards.

Unfortunately, many persons take up fruit-growing who have not the faintest idea of what they are undertaking, and as a result we have thousands of acres of unprofitable orchards, pineapple and banana plantations, many of which have been planted in unsuitable soil or in unsuitable localities or in land improperly prepared and never thoroughly looked after, that are now either abandoned or so neglected as to be valueless; and, as previously stated, nothing more or less than a breeding-ground for all kinds of pests. The cleaning up of these worthless orchards and plantations is a matter that must receive immediate attention if the fruit-growing industry of Queensland is to make any progress. The cleaning up process will be in any case a costly one, and the longer it is delayed the more costly it will be. Growers must do their share of the work, as the Government cannot be expected to bear the whole of the expense. There is unfortunately a strong tendency on the part of many growers to shelve their responsibility, to put off anything that requires any expenditure of time or money, and expect the Government to come to their assistance. The sooner this idea is exploded the better for the fruitgrowing industry, as growers must recognise that it is only right that they should do their share of the work and develop a spirit of self-reliance, instead of trying to pass their responsibilities on, and expect the Government to come to their assistance whenever they ask for it.

Educational Progress.

The educational side of fruit culture has, thanks to the increased staff, made steady progress during the year, and several matters of great importance to citrus, pineapple, banana, and deciduous fruit growers have received attention. There is, however, a very great deal to be accomplished, as any investigation work requires constant and careful supervision, and, if reliable results are to be obtained, the work cannot be hurried. Up to the present the Fruit Branch has been handicapped by not having a sufficient staff of efficient officers capable of carrying out research work, and in order to remedy this defect, three officers have been given special training both in the orchard and at the Queensland University. By this means it is hoped that a capable and highly efficient educational staff, possessing local knowledge and experience, will eventually be secured, and should it be necessary to obtain special information on any particular branch of fruit culture not obtainable in Australia, then one of our own officers should be sent to the country where such information is to be obtained, rather than import an expert from such country who has no knowledge whatever of our climate or local conditions, and is heavily handicapped in consequence. The policy recommended is to train our own experts rather than to depend on obtaining them elsewhere, and although we are somewhat late in making a start, it is a case of better late than never. The Fruit Branch has also been badly handicapped by not having a fruit experiment station within easy access of headquarters, as the lack of such a place has prevented us carrying out many important investigations, which require to be continued over a series of years, as well as many that are of a more temporary nature. Investigation work of any kind necessitates our having an absolute control of every detail, and this is not possible where the work is being attempted on private property.

Twenty-nine years ago the Department leased a suitable area of land at Redland Bay on which to carry out the work of investigating the various problems confronting the growing of fruit and vegetables, and a comprehensive series of practical fruit experiments were initiated. Unfortunately, the Government of the day did not consider the work of sufficient importance to warrant the small expenditure incurred and closed the place down when little more than initiatory work had been completed and before any definite results had been obtained. This action was very unfortunate and undoubtedly retarded the development of the fruit industry of this State, as, had the work then initiated being continued, many of the problems that confront fruitgrowers to-day would have been solved years ago, and the establishment of a fruit experiment station would not be so essential as it is at the present time. The establishment of such a station should be undertaken at once, as it will be of the greatest assistance, not only to the Fruit Branch, but to the Biological Branch as well, as this branch, which is in close touch with the Fruit Branch, is also very badly in want of a convenient place in which to carry out practical investigations in the field on numerous fungus and insect pests—investigations that require to be conducted under conditions which can be absolutely controlled and which will permit of definite and reliable results being obtained. Such a system will also prove a very valuable training ground for the officers of the Fruit Branch, especially if combined with a special University course. The Fruit Branch requires highly efficient officers and, as such are by no means easy to procure, men showing a marked aptitude for the work will have to undergo a special training in order that they may attain that degree of efficiency, the possession of which is so essential to anyone engaged in the work of instruction or investigation.

THE BANANA INDUSTRY.

The banana is by far our most important fruit commercially, as its cultivation not only provides a living for a large number of white growers and their families but the marketing of the fruit gives employment to many transport workers, timber-getters, and sawmillers, and is an important source of revenue to the railways of this and the Southern States. The industry is of national importance, and should be fostered in every possible way, as, should it fail, either as a result of disease or neglect, its loss would be a very serious one to Queensland. In order to prevent the possibility of the industry failing, much more attention will have to be given in future to the selection of the land in which to grow bananas, the cultivation and manuring of the land, the systematic suckering of the stools, and keeping the plantation free from disease. Unfortunately, insufficient attention has frequently been given to these essentials, and many growers have been inclined to look upon banana culture more as a gamble than as a staple industry, and to plant up any available areas, take as much as they can off the plants with the least possible labour, and when the plantation is no longer profitable walk off and abandon it. This has been done in many instances, and very serious results have already followed, as these abandoned and neglected plantations are breeding-grounds for countless numbers of beetle borers, and in districts where bunchy top is present are a fertile source of disseminating this disease. As stated in my opening remarks these worthless, abandoned, diseased, and neglected plantations must be destroyed. As long as they are allowed to remain in their present state, there is no possibility of keeping bunchy top or beetle borers in check, let alone exterminating these very serious pests.

There are some thousands of acres to be dealt with, and unless a determined attempt is made to clean them up the future success of banana culture in many districts in the southern part of the State is seriously menaced. Queensland cannot afford to lose its banana industry, and there is no reason for it to do so, provided we scrap our policy of procrastination and get systematically to work to place it on a sound and satisfactory basis. Far too much inferior fruit has been grown in the past, much of which has been sent to the Southern markets and has seriously injured the reputation of our bananas. Much of this fruit has been the produce of neglected or diseased plantations, or has been grown in land in which bananas should never have been planted, and the destruction of such plantations will materially benefit the growers of good fruit, as good fruit will sell on any market, whereas inferior rubbish is hard to dispose of at any time and is unsaleable on a glutted market.

Diseases and Pests.

The diseases of bananas have occupied a large amount of the time of the Fruit Branch, which has been intimately associated with the work of investigation that is being carried out by the Bunchy Top Investigation Committee, as well as with the investigations of the Biological Branch of the Department.

In the case of bunchy top, squirter, and leaf spot, that are receiving the special attention of this Committee, important headway has been made during the year, as in the case of the former disease it has been definitely proved that it is due to an

ultra-microscopic virus which is carried by one species of aphis from a diseased to a healthy plant, and as far as is known cannot be transmitted by any other insect or to any other plant except those belonging to the banana family. This most important and valuable discovery was fortunately made prior to the discovery of the outbreak of bunchy top in the Dayboro' district, on the last day of December, 1925, as it has enabled us to take steps to restrict the transference of the disease; and I am of the opinion that, if the recommendations of the Bunchy Top Investigation Committee are given effect to, and every banana grower makes himself conversant with the symptoms of bunchy top, particularly in its initial stages, and immediately destroys any and every stool in which the disease is seen, that bunchy top can be so controlled as to be no longer a menace to the banana industry. Bunchy top can only be spread by the aphis carrying the virus from a bunchy top infested plant to a healthy plant, and therefore if every infested plant is destroyed as soon as seen, there will be no virus to transmit, and the aphids will do no harm, as they are not the cause of the disease but are simply the carriers of the disease from a diseased to a healthy plant. This is a very important point, and every banana grower is urged to systematically inspect his plantation at regular intervals so that, should disease make its appearance, it will be discovered before it has become fairly established, and can be stamped out. A detailed examination of every banana plantation in the State by Government inspectors is a physical impossibility, as it means an individual inspection of every banana plant in the State and cannot be carried out, but growers can do the work, as in the cutting of the fruit and the chipping of the plantation they see every stool and therefore, if they are thoroughly conversant with the disease, they are undoubtedly the best inspectors and can be of the very greatest assistance to the Department in its attempt to control this very serious pest.

Some growers do not even yet realise the seriousness of bunchy top and think other diseases, such as beetle borer, a greater danger. Let them make no mistake, however, once bunchy top gets the upper hand all other diseases are of a secondary importance, as there is no longer a fruit-yielding plantation but a number of stunted malformed plants that will not die but are a persistent menace to all adjacent plantations and to the State as a whole.

Unfortunately, before it was known that bunchy top was present in the Dayboro' district, large numbers of suckers had been sent from there to the Innisfail district as well as to other parts of the State. This necessitated a careful inspection of every plantation in the Innisfail district and bunchy top was found to be present. Immediate steps were taken to destroy all affected plants, and two extra inspectors—banana growers who had been heavy losers from the disease in the Currumbin district, and were thoroughly acquainted with it—have been appointed temporarily; and are now making a thorough and detailed inspection. So far, the outbreaks have been isolated ones, and only a few plants have shown the disease, so that it is hoped we have it under control, and that there will be no further trouble. It is, however, premature to make any definite statement, and some time must elapse before we are sure that the disease has been stamped out and are able to declare the district free from bunchy top. In any case it is of great importance to keep this district clean, and no banana suckers will be permitted to enter that part of the State that is north of the Herbert River from any other part of Queensland or elsewhere.

At present the transfer of suckers in any part of the State is totally prohibited as, until it has been definitely determined how far the disease has spread and what districts are so far free, it is not advisable to shift any suckers even from plantation to plantation in the same district, as the disease is of such an insidious nature that no risks can be taken. In the meantime a careful inspection of the area lying to the north of the known infested area in Southern Queensland is being carried out, and as soon as it is safe to do so, the prohibition now in force will be relaxed under certain conditions so as to permit the planting of new areas during the coming season.

Beetle borer is a serious menace to banana growers, and is spreading rapidly, thanks mainly to the neglected and abandoned plantations which form an ideal breeding-ground for this pest. Numerous experiments have been carried out in order to determine the possibility of successfully combating it, but so far there is nothing better than trapping systematically with poisoned baits; and I feel certain that there will not be any appreciable diminution of the pest until the large numbers of neglected, abandoned, and badly-diseased plantations are completely destroyed.

Rust has not caused any serious loss in the Southern part of the State, but has done considerable damage in the Innisfail district and parts of Coastal Central Queensland. The entomological staff is dealing with this matter, and as a result of their investigations remedial measures which promise well are being tested. Leaf spot is a disease that must be given more attention by growers, as when it appears in a severe form the crop is destroyed, and even when it is only present to a slight extent it throws the plants back and the fruit does not develop to perfection.

During the year we had a visit from Mr. Campbell, the mycologist of the Fijian Department of Agriculture, who came here to investigate leaf spot, as this disease, or one very similar to it, caused serious loss to Fijian growers. Leaf spot can be controlled by the use of fungicides applied as a dust as can also fruit spot or Anthracnose. A fruit spot caused by the puncture of a sucking bug has also received the attention of the entomological staff, and an effectual remedy has been discovered.

Squirter is being specially investigated by Professor Goddard, who is carrying out a very large number of experiments to determine the cause of and the possibility of controlling this serious trouble, which causes such heavy losses in fruit sent to the Southern States during certain periods of the year. The results of Professor Goddard's investigations are awaited with interest as, until they are known, it is not advisable to definitely decide on any particular pack for the Southern markets.

During the year Mr. Wm. Ellison, junr., was temporarily appointed as banana packing instructor, and his appointment has given general satisfaction. In addition to being an expert packer, he possesses a good practical knowledge of banana culture, and has thereby been able, not only to give instruction in packing the fruit, but to advise on all matters connected with the growing of the fruit and the care of the plantation. He recently packed a quantity of fruit for the Melbourne and Sydney markets which he saw unpacked when it reached its destination. His pack was favourably commented upon, but, as I have already stated, no pack will be definitely decided upon until the results of our squirter investigations are known.

Northern Revival.

In the course of the year there has been a resuscitation of banana growing in Northern Queensland, along the line of the Northern Railway from Cardwell to Cairns, and as the climate of this part of the State is more suitable for the growing of this fruit than that of the more Southern banana-growing districts, there is a probability of a large output of fruit from this district in the near future, which will more than make good any decreased yield that may occur in the South. The present decreased yield in the South is the result of last winter's cold and last summer's drought, but the yield will increase from now. Considerable areas of new land are being prepared for the present season's planting, despite bunchy top, beetle borer, and other pests, as growers have not lost faith in the industry; and if they will only plant in good soil, in suitable localities, take good care of their plantation, grow nothing but good quality fruit, and market it honestly there is no reason why they should not obtain a good return for their labour and outlay provided the seasons are favourable.

PINEAPPLE CULTIVATION.

As already stated, better marketing arrangements have had the effect of stabilising and improving prices, and the industry is in a better position now than it has been previously. Despite the many years that have elapsed since the commercial cultivation of pineapples was started in this State, there are still many growers who fail to realise the importance of thoroughly preparing the land prior to planting, or of carefully selecting the suckers with which to plant the land when prepared. These factors, combined with the selection of unsuitable land on which to grow this fruit, are responsible for the failure of many plantations to produce good crops of first-class fruit or to suffer from the so-called pineapple disease or wilt.

Suckers should only be taken from plants that are free from disease, that produce fruit of good size, shape, and quality, and possess a healthy root system as well as the habit of suckering as close to the soil as possible, instead of taking suckers indiscriminately from any worn-out plantation, as very frequently happens. Careful selection of suckers will undoubtedly improve the yield and quality of the product, and this has been proved in no uncertain manner during the past season at the Bribie Nursery, where a number of suckers specially selected from healthy plants, that had produced high-class fruit, were planted in practically pure sand, and yet every sucker produced a fruit, 75 per cent. of which were the right size and type to fill a 30-oz. can. Results such as this could be obtained generally, provided the same care and attention were given to the selection of the suckers, and if carried out systematically by growers, the result would be that, instead of the summer crop yielding about 10 per cent. of fruit suitable to filling a 30-oz. can, at least 60 per cent. of such fruit would be obtained, and we would then be able to put up a pack that would be a credit to the State and that could hold its own anywhere, as there is no question that our pines cannot be beaten for flavour.

Diseases and Pests.

The work of investigating the various diseases of pineapples has received further attention during the year, but there is little to add to the advice that has been given by the Department for many years—viz., to select suitable land, prepare it properly,

plant healthy selected suckers, keep the land in a state of thorough tilth, and maintain its fertility by judicious manuring. Most of the diseases of the pineapple are due to unsuitable soil, and in any soil that has an excess of mineral acidity there is always a likelihood of the root becoming injured and the plant dying of starvation owing to the inability of the root system to secure the plant foods esential to the healthy development of the plant. Any serious injury to the root system of the pineapple plant, whether same be due to insects, unsuitable, badly-drained soil, or mineral acidity, brings about the death of the plant sooner or later, and produces that decolouration of the foliage commonly associated with the so-called pineapple disease. There is no great extension of the industry nor is the same likely, as a number of the plantations in the metropolitan area are far from healthy and, with the exception of the Gympie district, there is little new planting being done. The Gympie district grows excellent fruit, and there are large areas suitable for its culture, so that should the demand arise there will be no difficulty in producing large quantities of fruit suitable for canning. Bowen continues to produce very fine fruit, but its cultivation is not extending to any extent in the Northern part of the State.

Should the further tests that are being made to determine the possibility of pineapples being placed on the European markets in perfect condition prove successful, this will give growers a new outlet for their fruit, as once the difficulty in transport is overcome, there is no reason why large quantities of pineapples should not be exported and sold at a price that will tend to enormously increase their present consumption.

CITRICULTURE.

Queensland has gained a reputation for the high quality of its citrus fruit, which is fully borne out by the excellent exhibits that are seen at many country shows and at the annual exhibitions of the Royal National Association in Brisbane, and it is of vital importance to the citrus industry that the high reputation be maintained. This can only be done by keeping our orchards in a healthy and vigorous condition, by growing nothing but suitable varieties producing the best quality fruit, by eliminating all unprofitable and inferior specimens, destroying those that are useless and heading back and re-working with more suitable varieties all trees that are only producing thick-skinned, inferior quality fruit that is hard to dispose of. During recent years there has been a heavy planting of citrus trees in the Southern States, so that our only chance of maintaining or extending our markets in these States is to produce fruit of such superior quality that it will find a ready sale even on a congested market, as there is always a good demand for a first-class article.

Many growers have unfortunately planted many trees that will never yield profitable returns, as they will never yield a high-class product, and the sooner such trees are re-worked with first-class varieties, or, if diseased as well, taken out and burnt, the better for the industry. These remarks apply particularly to the growing of lemons in Coastal Queensland, where thousands of trees have been planted that are practically useless, as the fruit is very inferior and often quite unusable, as it has little or no juice and the flesh is a mass of gum. Such trees are usually smothered with scale insects, fungus pests, and other insects, and are nothing more than a breeding ground for all pests and a source of danger to all citrus trees growing in their vicinity. The lemon, on the other hand, when grown under suitable climatic conditions, which seldom exist in coastal districts, does well in Queensland, and there is a good market for such fruit, as, if cut at the right period, carefully handled, and properly cured, it can be kept in perfect condition for months and will supply the demand during our summer season when we are more or less dependent on imported fruit.

During the year the Department has conducted a number of orchard experiments in order to determine the best way of dealing with neglected trees, by manuring or otherwise, as well as the best means of treating such pests as the bronzy and spiny orange bugs, scale insects, root borers, and other diseases. New methods of destruction have been tried, amongst others the use of calcium cyanide as a dust in place of generating hydrocyanic acid gas for fumigation purposes by using sodium or potassium cyanide with sulphuric acid. It is too soon to make a definite statement, but from the experience gained already, it appears that the use of calcium cyanide in the dust form will be likely to prove of value to our citrus growers.

An old enemy, the Queensland fruit fly, still takes a heavy toll from citrus growers, many of whom do not yet realise the importance of destroying all useless, fruit-bearing plants that harbour this pest and of systematically trapping every mature fly early in the season as well as gathering and destroying every fly-infested fruit.

There is an improvement in the packing and grading of citrus fruit, and many of the exhibits of packing seen at the various shows are a credit to the exhibitors

So far the vexed question of a standard case for citrus fruit has not been settled, and until growers can come to a definite agreement on this matter it is impossible to fix grade standards for citrus fruits in this State, although it would be to the benefit of our growers if they would fall into line with the standards adopted in the Southern States. The question of obtaining a reliable supply of trees for planting out should also be settled, as many of the orchards planted during recent years contain a number of useless, unprofitable, or unproductive trees, that have been propagated on unsuitable or diseased stocks, from scions taken from diseased, constitutionally unhealthy, or unproductive trees of inferior varieties, that cannot be expected under any conditions to produce a satisfactory tree that will yield regular and good crops of first-class fruit.

This is a matter I have dealt with many times, as I am confident that many of the most troublesome diseases of citrus fruits are capable of being transmitted both by the stock and scion, and nursery stock so affected is doomed to failure from the start. The only way to get over the difficulty is for co-operative bodies of citrus growers to establish their own nurseries and propagate nothing except on absolutely healthy stocks, worked with scions taken from healthy productive trees yielding fruit of the highest possible quality. If this is done, I am certain that the high reputations that our really good citrus fruits have attained will be maintained in the future, and that a ready market at a remunerative rate will be obtained for a first-class article.

DECIDUOUS FRUITS.

The granite belt is our main source of supply of deciduous fruits, though selected varieties of early-maturing peaches as well as Chickasaw and hybrid Chickasaw plums have been a profitable line on the coast, where the fruit fly has been kept in check by systematically trapping. In the Stanthorpe fruit district good crops of excellent peaches, nectarines, plums, apples, pears, and grapes were grown, and the prices realised for quality lines were very satisfactory, though inferior lines were hard to dispose of.

A record of the examination of the different fruits sent to the Brisbane market showed a great improvement over previous years, in that the number of cases of fruit of all kinds ordered to be picked over for diseases of all kinds, decay, &c., only amounted to 5,091, of which only 355 were destroyed and 902 lost in repacking, as a result of overripe, rotten, and diseased fruit. This is very satisfactory as the loss was very much less than that experienced in any recent year. A dry season, greater care in handling and packing, and the destruction of fruit pests are responsible for the improvement.

The grape crop, both on the coast and inland, was of very good quality, and I do not remember having seen finer samples of several varieties of grapes than those grown in the Stanthorpe district. The officer in charge of the field inspection staff, Mr. T. W. Lowry, whose headquarters are in Stanthorpe, reports that, although the district as a whole escaped serious damage from hail or heavy storms, yet a portion of the district lying to the south and east of Stanthorpe suffered somewhat severely from hail. Unfortunately, there is always a danger of hailstorms causing serious loss, and an attempt should be made to test the possibility of breaking up the clouds in which hail is formed, before the actual formation of the ice particles takes place, by means of explosives or otherwise, as the experience of hailstorms in the Stanthorpe district is that they follow certain lines or belts of country, and it should therefore be possible to arrange means for breaking them up before they cause serious damage. Mr. Lowry states that two growers in the Glen Aplin district used fine wire-netting to protect their vines against hail and found that it paid them to do so, as the netting not only prevented the hail from damaging the vines and fruit but also protected the fruit from the attack of birds; which, especially in a dry season, when their usual supply of food is scarce, do a lot of damage to all kinds of fruit. He also reports that, probably as a result of the hot and dry season, fruit fly did comparatively little damage, and it was not until the latter end of January, when an influx of flies from outside the district took place in a number of orchards, that the fly did any damage to speak of, and even then some parts of the district were practically free from this pest.

A special officer was appointed temporarily to give instruction in fruit packing during the season, thus following up the work of the late Mr. Rowlands, and as a result of the instruction growers have received there is a very marked improvement in the manner in which the fruit is placed on the market for sale. Seven temporary inspectors were also employed during the fruit season in order to see that the regulations governing the gathering of fallen fruit and the destruction of diseased fruit were carried out. Action has also been taken to clean up a number of abandoned and neglected orchards, and this work will be continued, as such places

are only a breeding ground for pests of all kinds and a source of danger to all neighbouring growers.

The marketing of the crop has been carried out mainly under the auspices of the Committee of Direction of Fruit Marketing, with satisfactory results.

Other Fruits.

There has been a good crop of custard apples, and this excellent fruit is steadily gaining favour in the Southern States, to which large quantities are now being sent. Papaws have also done well, and there is a fairly good demand for the fresh fruit trade as well as for the manufacture of chutneys and sauces. Passion fruit is becoming more and more difficult to grow, and many of our best producing areas are now so badly affected with leaf spot that its cultivation is no longer profitable. The cause of the trouble is being investigated, and it is hoped that an effectual remedy will be discovered, as where the plants are free from disease they yield a good return to the grower and there is a steady demand for the fruit both for consumption in the fresh state and also for preserving.

Strawberries were a profitable crop and where they are irrigated the returns are fairly constant. Many growers have installed irrigation plants, and have proved the investment a profitable one, as the strawberry soon suffers from a dry spell. The quality of the fruit was excellent, both for table use and jam making.

The cultivation of tomatoes is now an important industry, as will be noted by the volume of the exports, as no less than 321,851 packages of fruit were forwarded to the Southern States during the year, in addition to which the local consumption is very heavy, as tomatoes are in daily demand as a staple food throughout the State. Potatoes, on the other hand, are not grown to anything like the extent they should be, and during the year this State has imported about 30,000 tons. This is largely due to the unfavourable season, but there is no reason if more attention were given to this crop and better cultural methods adopted, that Queensland should not be able to produce the bulk of its requirements, instead of having to go outside the State for our supply.

Bribie State Nursery.

A sudden drop in the temperature during the last winter injured a number of the trees and plants growing at the nursery, and this cold spell was followed by months of the driest weather ever known on the island. Fortunately, our water supply held out, but, with the extension of the bushhouses and other work, an increased supply is required, and arrangements are being made to secure it. There is practically an unlimited supply of very pure water within a few feet of the surface, so that all that is required is to increase the pumping capacity of the present plant. Experience has shown that bush-house propagation is essential, as the young plants require protection from the direct rays of the sun.

Very good results have been obtained from the experiment that is being conducted to determine the possibility of improving smooth leaf pineapples by careful selection, as the fruit produced last summer was of very even type, especially adapted for the canning trade, a very important consideration when we have to dispose of our surplus fruit to canners. This experiment will be continued and results carefully watched.

The young thin-shelled Queensland nuts, pecan nuts, and avocadoes have done well, and where they have been planted out in their permanent positions, the majority have made a satisfactory growth. The worked trees imported from the United States of America have not yet fruited, but it is probable that several of the varieties will fruit during the year. Large numbers of banana plants have been propagated from the single eye, and, prior to the proclamation prohibiting the transfer of banana plants, a number were distributed to several parts of the State. Neither bunchy top nor beetle borer have been seen in the plants, and every possible care is taken to prevent the introduction of these diseases.

In order to produce a new strawberry that will take the place of the varieties now commonly grown, and which are showing signs of deterioration, a quantity of seed was obtained from Queensland grown fruit and was specially selected from plants that were of a vigorous habit, and heavy producers of high-class fruit. A number of seedlings were raised from the selected seed and some of them give promise of being heavy producers of good fruit, but no definite results can be expected until they have produced their second crop, which is now showing. A quantity of named varieties were also imported from England, but unfortunately the bulk of the consignment died in transit; one or two varieties that survived, however, promise to do well. A quantity of seed was also obtained from the United

States of America, from which a large number of seedlings of many types have been raised and planted out in the bushhouse. Although the seed was only planted last spring, several plants have already borne fruit and many now show blossoms. Many of the plants are very vigorous growers, and amongst the large number we are testing, I am in hopes that we will get one or more plants that will show special merit and from which the future strawberry crops will eventually be produced, as once it is certain that a particular plant is just what is required, we will propagate from it as quickly as possible, in order to get enough plants to set out an area from which runners can be distributed to growers.

Tests are also being made with little-known varieties of passion fruit in order to see whether it is possible to obtain plants that will produce a marketable fruit of high quality that is free from leaf spot.

A number of seedling apple trees are also being grown from seed obtained from England, and when big enough to be worked they will be budded or grafted with varieties suitable to the Stanthorpe district, to be planted there permanently in order to see whether they will be resistant to crown gall or hairy root. Many experiments have been carried out at the nursery during the year, and the work has been carried out in an efficient manner under the direction of the manager, Mr. T. Mitchell.

Fruit Diseases Act.

As stated, it is proposed to amend the present Act in order to give the necessary power to enable it to be administered in a more efficient manner, as it is imperative that the many abandoned, neglected, and diseased orchards and banana plantations be efficiently dealt with, as if this is not done the fruit-growing industry of Queensland is not likely to make any progress. A number of temporary inspectors were appointed for the fruit season in the Stanthorpe district, and, as already mentioned in this report, there was much less loss there from fruit fly and other diseases than during previous years, and this decrease can be accounted for by the dry season and the care being taken to gather and destroy all infested fruit. On the last day of December, bunchy top was discovered at Rush Creek, in the Dayboro District, and as a result it was necessary to make an inspection of all the surrounding banana plantations. This necessitated every available officer of the Fruit Branch who had any field experience being employed on this work, even at the risk of neglecting other branches of the fruit industry, as it was of vital importance to determine as quickly as possible how far the disease had spread and to which part of the State suckers had been sent from the infected area. This necessitated a large amount of extra work and expense, which has, however, been justified, as it has enabled the Department to follow up the plants sent to other districts, and in cases where bunchy top has broken out in the plants so sent to take steps for its immediate suppression.

The inspection work is still being carried out, and it is not possible to say when it will be completed. So far as is known at present the disease, which was transferred to the Innisfail district by means of infected suckers, is now well under control, and it is hoped that the slight infestation that has taken place there will be stamped out. In order to bring this about, two practical banana growers, who were thoroughly acquainted with bunchy top, were appointed as temporary inspectors and sent to Innisfail, where they are still engaged in inspecting plantations, and should no further outbreaks occur, it would probably be possible to declare the district north of the Herbert River clean by about the end of the year.

SUPPOSED POISONOUS WEEDS.

The Government Botanist, Mr. C. T. White, F.L.S., has supplied the following information in answer to a correspondent:—

> The specimen forwarded by Inspector O'Bryen is the "Narrow-leaved Sage" (*Salvia lanccifolia*), a native of the United States and Mexico, naturalised in Queensland for some years. It first made its appearance in the Pittsworth district, where it is now very common, and has spread to other parts of the Downs. The plant has the reputation in Queensland of being harmful to stock, but no feeding tests or experimental work of any kind, so far as known, has been carried out with it. In America it is recorded as a troublesome weed in the Western United States, but we can find no record of its being regarded as harmful there. Some of the same family cause "staggers" or "shivers" in stock.

DAIRYING IN QUEENSLAND.

By CHAS. McGRATH, Supervisor of Dairying.*

Seasonal conditions in the early part of the year proved favourable, and resulted in the production of increased quantities of dairy products. Dry weather was experienced during the latter half of the year, and as a consequence a falling-off in production occurred during that period.

The following are the particulars of dairy produce manufactured during the season:—

	Lb.
Butter	60,496,753
Cheese	12,515,895
Condensed Milk	9,771,763

BUTTER PRODUCTION.

The average quality of the first-grade butter was higher and the grade generally more uniform than previously.

The world's butter test held in New Zealand claimed attention, and brought into competition the finest products from centres of dairying throughout the world. The general high quality of Queensland butters was commented on by the experts to whom the duty of awarding the honours was entrusted.

The Oakey District Co-operative Dairy Company gained second place, being one-half point below the award allotted to Rangiwahia-Ruahine Dairy Factory, New Zealand. The result of the test has had the effect of drawing the attention of oversea traders to the excellent quality of our butters.

There was an increase in the quantity of second-grade butters, attributable to unfavourable climatic conditions during the period of high production.

Heavy falls of rain occurred in December and January, accompanied by abnormally high temperatures. Such conditions favoured the development of undesirable bacteria and produced rank growth of pasturage, especially on low-lying areas. Milk and cream produced from such pastures at that time were wanting in full natural flavour and aroma.

Interruption of operations occurred in several of our butter factories in consequence of the installation and additions to manufacturing plants. Such disorganisation was also a factor that tended to increase the output of second-grade butter during the season.

Want of care and attention in the production and handling of the cream was in evidence in many cases, especially during the period of the heat wave. Frequent and regular deliveries of cream will assist to improve the grade of buter generally, with benefit to the producer.

Modernisation of dairy factory buildings and equipment, rebuilding and remodelling of dairy factory premises have received a deal of attention in our chief dairying centres, and we have factories of the most modern type, the erection and equipment of which cost from £30,000 to £60,000 each.

The new factory of the Wide Bay Co-operative Dairy Association, Limited, at Gympie, constructed of brick, concrete, and iron, was completed and equipped with modern machinery. This factory is claimed to be the largest butter factory in Australia.

The erection of a new factory building for the Maryborough Co-operative Dairy Association at Kingaroy is nearing completion, which, when finished, will rival the Wide Bay Co-operative Dairy Association's factory in size and equipment. The superstructure is of wood and iron. The building of the Maryborough Co-operative Dairy Association's new factory at Mundubbera, which is being constructed of similar materials to the factory at Kingaroy, is also nearing completion.

The Port Curtis Co-operative Dairy Association, Limited, at Gladstone, erected cold stores with a storage capacity of 4,000 boxes of butter, and is now extending the stores to accommodate over 10,000 boxes. Further improvements to this factory are in hand.

The Queensland Farmers' Co-operative Association has erected a modern factory of brick and concrete at Grantham, fitted with the latest improved butter factory equipment. This factory compares favourably with the most modern of butter factories.

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* In the Annual Report, Department of Agriculture and Stock, 1926.

Power Plants.

Suction gas and crude oil units are taking the place of steam and are giving economical and satisfactory service.

The use of electric units to operate the various sections of the dairy factory has been found to increase economy in many instances.

Increasing operating costs render necessary the attainment of industrial efficiency by the installation and use of modern industrial units in all our dairy factories.

Glass-lined batch pasteurisers, cream forewarmers, and cream-holding vats have been installed in butter factories recently built or reconstructed.

Manufacture.

Pasteurisation of cream for butter-making is carried out in all butter factories in this State, and the butter produced is now more uniform in character with increased durability.

It has, however, been noticeable that since the process of pasteurisation of cream at factories has been adopted that no general improvement has taken place in the quality of the cream supplied, and that in some districts the quality has tended to depreciate rather than improve. This is apparently caused by dairymen having the erroneous opinion that it is unnecessary to take particular care that pasteurisation will eliminate all defects in cream.

Mr. Dairy Instructor Watson states that a good deal of progress was made in manufacturing methods in his district, and that factory operatives were generally found to be eager to obtain information regarding both theory and practice of butter-making.

There is evidence that, in a few instances, the quality of the butter deteriorated owing to want of care in the neutralisation of the cream, prompted by a desire to economise in time.

Careful estimation of the quantities of cream to be treated, accurate determination of the acid content, and the addition of the correct quantity of neutraliser to the cream are essential in obtaining the benefit of the process. Sufficient time must be allowed for the neutraliser to do its work.

The use of cream forewarmers would impart efficiency to the process of neutralisation.

Transportation from Farm to Factory.

The gap between the producer and his factory requires to be bridged with modern means of transport, ensuring rapid and economical delivery of the products of our dairy farms at manufacturing centres.

Motor road and motor rail service has proved efficient and satisfactory where utilised, and an extension of the system is urged. Two rail motors to be used for the conveyance of cream from the farm to the factory are under construction at the Railway Workshops.

Organisation of the systematic transport of dairy produce from the farm to the factory by the co-operative governing bodies is essential in producing a satisfactory delivery service. Uncontrolled competition in the cartage of cream has in several districts proved wasteful and unsatisfactory.

The Dairy Farm.

Improvements to dairy farm premises are being gradually carried out in all districts. Milking machines are being introduced on many dairy farms throughout the State.

The modern milking plant is efficient and sanitary when controlled by a capable dairy hand, who will give attention in detail to the working, cleansing, and care of the plant. Installation of plant should provide efficiency in operating and facilities for cleansing and sterilising.

Instructional Work.

With a view of increasing the efficiency of the work of dairy inspectors, it is proposed to offer improved facilities for travel throughout their districts.

By co-ordinating the work of the dairy inspectors and dairy instructors it is hoped that the services of such officers will tend to be more instructional, and we look for the co-operation of all dairy farmers in an effort to raise the standard of our dairy products.

CHEESE MANUFACTURE.

Climatic conditions ruling in January, February, and March (heat wave) had a detrimental effect on the quality of the cheese produced at that period.

Pasteurisation has been adopted by factories and has resulted in the production of a more uniform and improved article generally.

Cheese from pasteurised milk cures slowly and has a more open body than the product of raw milk, but the clean flavour, improved storing qualities, and uniformity of the cheese warrant the application of the process in all cheese factories.

The process tends to lessen or eliminate food flavours, and destroys or checks the action of undesirable bacteria. Pasteurisation does not provide the means of renovating poor or low-grade milk and all milk should be carefully graded. Pasteurisation of milk will become general in the cheese industry in the near future.

The quality of cheese has not been all that could be desired, low quality being particularly noticeable during the summer.

Mr. Cheese Instructor Snell advises that acid-cut has been a very prevalent fault in his district.

Immediate improvement was apparent on cheesemakers acting on his advice to lower the wheying off acidity by two or three points.

Weed taints are always with us and have been very prevalent during the past season. Factory managements experienced great trouble in making a first-class cheese from the milk so tainted. Even with the aid of the pasteuriser, the cheese was far below that of normal times.

This state of affairs could be greatly minimised if the farmers went in for some system of fodder conservation. The factories generally are in good order, and the managers and staffs are well acquainted with their work. If the milk is delivered in good order they are quite capable of turning out a first-class article.

Last year a good deal of trouble was experienced with uneven colour in cheese, but during the season under review there were very few complaints on this score, the colouring generally being very even.

The general finish of our cheese has much improved, and the crates and packing are quite attractive.

The cheese industry is now firmly established, and with favourable seasons its future is bright.

The despatch of cheese from factories to exporting agents uncrated resulted in a deal of damage to the product. Uncrated cheese arrived at the port of shipment marked with dust, while green cheese was found out of shape and in some cases broken open.

A regulation (Regulation No. 98A) dealing with the crating of cheese intended for export was brought into force in order to overcome the loss occasioned thereby.

Cold Storage of Cheese.

The cold storage of cheese is a matter which is receiving the attention of the Department. It is evident that unsuitable temperatures and conditions under which cheese is stored at factories and stores awaiting shipment and sale is responsible for a deal of deterioration in quality and financial loss.

THE MARKETING OF DAIRY PRODUCTS.

The activities of the various bodies operating under legislative provisions have been of much benefit to the dairying industry.

Interstate conferences of representatives of the producing interests have co-ordinated the work of marketing throughout the State, and a more orderly system has been evolved.

Paterson (Delroy) Price Stabilising Scheme.

Owing to serious fluctuations and decline in the butter market the Paterson scheme was brought into force as from the 1st January, 1926.

Although voluntary, this scheme has the support of practically all butter and condensed and milk powder manufacturing managements throughout the States. The scheme has given stability to the prices ruling in interstate markets.

The Kangaroo Brand.

The adoption of an all-Australian brand for all high-grade butter exported overseas has had a beneficial effect on the price ruling for Australian butter on the London market.

The Hamilton Cold Stores.

The Hamilton Cold Stores were utilised during the present season, and during the period of high production the support accorded was satisfactory. They are the most modern and spacious cold stores in the Southern Hemisphere. Special facilities for loading from cold stores to ship's hold, so as to avoid fluctuations of temperatures, are also important factors in maintaining the storing properties in butter intended for export and storage.

Ministerial Conference.

A conference of Ministers of Agriculture, all the States being represented, was held in Brisbane on 7th June last, when the following matters, amongst others, pertaining to the dairy industry, were dealt with:—

(*a*) Standardisation of the grading and examination of dairy products placed on the interstate and intrastate markets.

(*b*) Co-ordination in experimental and research work relating to the dairy industry.

(*c*) Question of the compulsory installation in dairy produce factories of thoroughly tried-out and approved machinery.

(*d*) Commonwealth financial assistance to the States in regard to the dairying industry.

(*e*) That the Commonwealth Government defray shipping, rail, and quarantine charges on approved pure-bred farm or dairy stock imported from overseas.

(*f*) Legislative control of the use of sires for the improvement in breeding of grade dairy cattle.

IMPROVEMENT OF DAIRY HERDS.

The health of the dairy stock has been good, no outbreak of disease having occurred during the period. The veterinary officers examine and deal with any animal reported as showing signs of ill-health. A number of animals suffering from minor ailments received veterinary attention.

The desire of the Department to assist in the all-important matter of herd improvement is evidenced by the inauguration by the Minister for Agriculture, the Hon. W. Forgan Smith, of the better bull scheme, which makes provision for the payment of a subsidy of £1 for £1 to the purchasers of approved dairy sires. A number of applications have already been dealt with.

Herd Testing.

The manufacturing and marketing departments of the industry are in advance of the producing section. The matter of herd testing, culling, and feeding on production lines has not received the attention necessary to secure to the primary producer the full benefits of the modernisation of the secondary branch of the industry.

The following is the report of Mr. L. Andersen, Senior Herd Tester:—

"Generally speaking, the season under review has been very hard for the man on the land.

"The spring commenced very dry and hot with spasmodic thunder showers giving slight relief here and there.

"During the months of November and December good storms fell in most of our dairying districts and gave promise of a fair season, but unfortunately this was followed by a long spell of extremely hot and dry weather, which practically burned up the pastures in many places.

"With the exception of the coastal areas, the seasonal rain, which we look for in January, February, and March, did not occur, with the result that most of the dairymen were unable to plant any winter feeds. However, some relief was afforded by autumn rains.

"A slight alteration in the system under which herd testing has been carried out by this department for some years was made at the beginning of this year.

Each farmer applying for the services of a herd testing officer, was asked to sign an agreement to the effect that he would submit his herd at least four times during the lactation period in order that proper records of production of butter could be furnished at the end of the season.

"I think this is a step in the right direction and, judging by the applications received from all parts of the State, it appears that farmers generally realise the advantage of this system.

"Unfortunately, the drought compelled a number of dairy farmers to dry off their cows prematurely, thus losing the full benefit of the testing. However, a number of groups of farmers have again signified their intention of carrying out a further test during the coming season, and I anticipate an extension of the work in this department.

"Eighty-two Local Producers' Associations made applications for the services of herd testers and submitted 524 herds, comprising 15,701 cows.

"In districts, West Moreton submitted 98 herds, Darling Downs 130, Gympie 67, South Burnett 109, Central 73, Gayndah 20, Gin Gin 9, and Atherton 20 herds.

"The general average production of milk and butter-fat is slightly below that of last year, while the average per cent. fat recorded was practically the same.

"The actual number of tests carried out during the year was 27,932, while in addition 150 samples of skim milk were also treated.

"This is approximately 6,000 more than last year, and had the season been even moderately good it is estimated that the number of tests would have reached 35,000.

"The compiling of records, which entails a great deal of work, is now in progress, and at the time of writing 300 dairymen have been supplied with records of cows submitted during the season. These should supply the owners with very important information, and it is hoped that dairymen will make full use of this in the culling of their herds.

"Cases can be pointed out in almost any herd where cows, equal in production of milk, show a difference of 50 to 60 lb. of butter when submitted to the herd tester for a lactation period, while in some instances a difference of 100 lb. is noted in the records of cows from the same herd and grazed in the same field.

"The highest production of butter-fat for a cow tested during the season for a period of 290 days was 366 lb., while the poorest cow in the same period produced 133 lb., a difference of 233 lb., which, taken at 1s. 6d. per lb., equals £17 9s. 6d. in favour of the better cow."

GRADING.

The following is the report of Mr. R. W. Winks, Senior Grading Inspector:—

"Compared with the previous season, that under review was at a great disadvantage owing to unfavourable weather conditions, particularly during the later months. This fact not alone accounts for a serious diminution in the quantity of the output, but also adversely affects its average quality. Owing to the shrinkage in supplies, cream is held too long at the farms, and thus, even in winter, though the temperatures are more favourable, over-acidity, faulty mixing, &c., are responsible for a far larger percentage of second and third class butter than otherwise would be the case. It may seem strange, but is nevertheless true, that better butter is often produced during summer than in winter, a fact due to the more frequent deliveries of cream when the supply is plentiful. During my experience I cannot remember when this was more exemplified than it has been by the season just closed.

"Out of the grand total of 655,512 boxes graded, 8.39 per cent. was choice, 54.46 per cent. first class, 22.56 per cent. second, and 9.02 per cent. third class. Pats and tinned butter were about .55 per cent., and as the bulk of these was first class the percentage of first-class butter, irrespective of that classified choice, would be about 60 per cent. of the grand total. But for the fact that under the Commonwealth regulations the minimum number of points for choice butter was 92, while that of the State was 93 points, a greater percentage of choice would have appeared under that heading. This anomaly, however, has been removed and 92 points is now the minimum standard for 'Choice' or 'Kangaroo' quality.

"The general standard of manufacture is good. Faults such as greasiness, sponginess, &c., often have been due to insufficient room and power to handle the cream at the factories during the busy part of the season. There is a general tendency to overcome this difficulty, and several up-to-date factories quite recently have been established in districts where the production is heavy, and with additions

and improved equipments in others the outlook for the ensuing season, so far as manufacturing conditions are concerned, is very favourable.

"Weed taints, with the exception of mustard cress in some localities, were not particularly noticeable.

"Fishiness, too, except in the case of a few factories, where it was very pronounced, was almost entirely absent. Streakiness and mottle, owing probably to the improved texture, the results of pasteurisation, have been considerably reduced, though some factories still require attention in that respect.

"In conclusion, but for the sub-normal conditions, which, as already pointed out, so seriously interfered with both the production and the transport of cream, dairying generally is on the upward grade, and with the advent of favourable weather dairying will again take its place amongst the foremost of our primary industries."

SUMMARY.

The period under review has been characterised by activities in all branches that have proved of benefit to the dairying industry.

The dairy inspector's efforts are directed to improving the conditions, production, and handling of dairy products on the farm. The work of the dairy instructors has been helpful in the manufacturing centres. The modernisation of dairy factories is an indication of the progressive ideas of the management of dairy companies, the most modern ideas of dairy factory buildings and equipment being featured in factories completed during the period reviewed.

The benefits of the Legislative Acts recently given effect to were in evidence during the period, and assisted in the stabilising of the markets for dairy products.

The elective boards functioning under the provisions of the Primary Products Pools Act have rendered a distinct and valuable service to primary producers, and their efforts are now more fully appreciated by all whose interests they serve and whose confidence and support are essential in securing for primary producers a fair return for their labour.

It is pleasing to note that the testing of dairy herds is receiving a greater measure of support, and I appreciate the assistance rendered by the Local Producers' Associations throughout the State for the interest taken and support accorded the Department's Herd Testing Scheme.

With the co-operation of all interests associated with the industry its progress is assured.

PROTECTING WATER-TROUGHS.

An inquiry has been made for a sketch of a device which appeared in "The Australasian" some time ago, for preventing injury to stock and to the water-trough itself. The illustrations and descriptions were supplied us from Western Australia. AA (Fig. 1) are supports of hardwood or saplings let into the ground, bolted together at the top, and placed at intervals along the trough to carry the side-poles, BB and

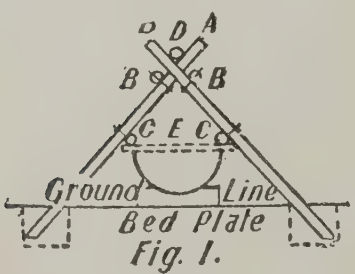


Fig. 1.

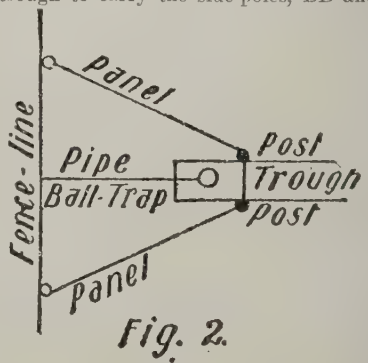


Fig. 2.

CC. These side-poles run the full length of the trough, and are bolted to the supports. If the troughs are for watering stock the horizontal pole, D, is used instead of the side-poles BB. A temporary board is placed across the trough at E to carry the side-poles, CC, but is withdrawn when these poles are bolted to the supports, AA. Fig. 2 shows an arrangement for protecting the ballcock.—"Australasian."

COTTON GROWING IN QUEENSLAND.

By W. G. WELLS, Cotton Specialist.*

The climatic conditions during the cotton season under review have been in many ways the worst experienced during the last five seasons. At the beginning of the planting season conditions were extremely unfavourable to securing a stand either on account of the very low soil temperatures or the heavy falls of rain which occurred after the planting operations were completed. By the time the soils had warmed up sufficiently to give a good strike over most of the cotton belt, the severe winds had caused such a loss of soil moisture as to preclude the possibility of obtaining a good germination. This condition of affairs continued until the first week of November, when general storms were experience in nearly every cotton area. Planting took place immediately after this with the securing of a good strike in nearly all districts.

The season from then on until the middle of January developed as if we were to have the best growing conditions that had been experienced in the above-mentioned five years. Rains of the proper intensity and of not too frequent occurrence fell in nearly all of the main areas, with the exception of the Lockyer, resulting in a very fine development of the fruiting system of all properly grown crops. This was especially noticeable in the early-planted fields, the lower parts of the plants being heavily laden with bolls by the middle of January and the upper parts covered with a fine crop of squares and flowers.

A period of severe drought, accompanied by high temperatures, set in at this time, and continued with little interruption well into March. The results from such weather conditions occurring right at the critical stage in the development of the fruiting system were extremely unfortunate, as not only was the complete top crop of squares lost, but the middle and even the lower crop of bolls, in some coses, were severely reduced in size.

The total yield for the whole of the State has naturally been greatly reduced from that which was anticipated earlier in the season, and is considerably lower than the 12,000-bale crop of last season, as on 5th June a total of 5,147 bales, averaging 481 lb. each, had been ginned, with a possibility of a few hundred bales more from the later receivals. This total does not represent a lower yield per acre, however, as of the 40,000 acres of seed which were applied for, it is doubtful if more than 25,000 acres came through to maturity owing to the inability to obtain a strike, late-planted crops failing under the droughty conditions, &c.

In the area which received the best rains early in January the yields have been excellent, considering the abnormally dry conditions which existed after that during the critical stage of the development of the fruiting system. In several districts many cases are on record where the yield per acre has averaged anywhere from 800 lb. to 1,200 lb. of good-bodied, full 1⅛-inch cotton, and in a few cases as much as 1,500 lb. Such returns received under extremely adverse conditions demonstrate the wonderful drought-resistant properties of the Upland type of cotton plant, and indicate that the farmers in the Southern and Central areas, where cotton can be grown profitably, should include the growing of this crop in their system of farming.

The general standard of the preparation of the seed bed and the cultivation of the cotton crop has shown a decided advance during this past season. The remarkable results obtained last season by the growers who paid careful attention to these points afforded an excellent illustration of the advantages to be obtained by early and thorough preparation of the seed bed, careful planting so as to obtain the correct depth of covering of the seed, early thinning to the proper distance between the plants, and frequent cultivation during the early stages of the plants' development. The result was a decided effort on the part of nearly every district this season to improve the standard of every operation—especially the preparation of the seed bed—and it is extremely unfortunate that the climatic conditions have been so severe, as the total yield for the whole of the cotton belt probably would have been the highest and of the best quality so far recorded for the State.

Callide Cotton Research Station.

The development of this station, which is of the utmost importance to the cotton industry in Queensland, has continued this season with very gratifying results. Another portion of the farm has been cleared, and proved to be of

* In the Annual Report of the Department of Agriculture and Stock, 1926.

exceptional uniform and fertile quality. The crop of cotton grown on this tract, while planted late owing to unfavourable planting conditions, has yielded between 1,000 to 1,200 lb. of seed cotton per acre of very excellent quality. The securing of such a fine plot of some 15 acres is extremely fortunate, as it affords the opportunity of conducting experiments of various natures without encountering the difficulties attending non-uniform soils.

The pure seed propagation work has continued along the approved lines, with satisfactory results. A plot of 6½ acres was sown of bulk selected seed of the Durango variety, grown last season on the Demonstration Farm at Monal Creek, and averaged around 1,200 lb. of good seed cotton to the acre. This plot was carefully inspected plant by plant by Messrs. Henderson, Nagle, and myself, and some 220 lb. of seed cotton selected from 670 plants. This cotton will be ginned and the seed obtained will be used to plant the same plot next season. In addition to this lot of material, special plants were selected for further progeny investigation. The remaining plants of the plot were picked in bulk, and will be ginned separately from the rest of the crop from the farm. The seed obtained from this lot of cotton will be sufficient to plant all of the cotton acreage of the Research Farm next season, and any of the surrounding farmers' crops, so that the purity of the farm's crop may be maintained. At the end of the next season there should be ample seed from these crops to plant the whole of the pure seed areas of the Callide and Upper Burnett Valleys, which in turn would yield sufficient seed to meet the requirements of the entire State in the season 1928-29.

Satisfactory progress has been made in the progeny breeding operations, and one strain has appeared sufficiently uniform and of desirable characteristics to warrant increasing. This strain will be planted on an isolated plot during the coming season, and if further tests demonstrate the superiority of this cotton over the bulk selected lots, the seed supply of it will be increased as rapidly as possible.

Investigations in the various cultural and thinning and spacing problems connected with the growing of cotton were continued along similar lines to those of last season. These investigations will be continued in the coming season as it will require several years' work before we may hope to reach any definite conclusions.

It is particularly gratifying to observe that the growers in the Callide Valley, who have been the most interested in the various phases of the farm's activities, and who have endeavoured to put into operation the practices which have been found to be beneficial, are securing, as a whole, exceptionally good cotton crops. It is anticipated that the experience of these farmers, in conjunction with the results being obtained at the farm, will be of material assistance in raising the yield per acre for the whole of this valley.

Pure Seed Propagation.

In addition to the progeny and bulk selection investigations in the Durango variety which were conducted at the Research Farm this season, similar operations were carried out in the other varieties which are being studied by the Department. Much of this work has been performed by Mr. R. W. Peters, especially in the Burnett and Kingaroy areas, where, with the assistance of Messrs. James Carew and N. E. Goodchild, bulk selected lots of the Durango and Acala varieties were obtained. This material will be grown by selected farmers in the same areas from which the seed was selected, for propagation for further investigations.

The selecting of bulk lots of the Durango variety in the Boyne Valley was continued this season by Mr. Nagle and myself. The material was collected from crops which had been planted with seed grown from selected seed of previous seasons, and the increased uniformity of length of staple and plant types was remarkable. Such excellent results from the method of selecting bulk lots of seed are exceedingly gratifying, and indicate that the continuation of our system of improving the stock of seed will have a marked beneficial effect on the supplies which will be available for general distribution in the future.

The investigations in the Acala variety at the Gatton Agricultural College and High School were continued again this season. Unfortunately, the extremely droughty conditions which have existed for most of the season have seriously affected the results of some of the experiments. The selection work was continued satisfactorily, however, several promising plants being obtained, from which a drought-resisting staple type of cotton may be developed, which will be suitable to the whole of the Southern areas. The opportunity is taken to express my appreciation of the hearty co-operation which Mr. J. K. Murray, the Principal, and his officers have given us in connection with this work.

Experimental Plots.

The investigations of the various problems of cotton culture have not been confined to the Callide Research Farm. Several sets of experiments have been formulated, which the officers of the field staff of the Cotton Section have arranged to be conducted by various growers throughout the cotton areas. These experiments touched on such subjects as the spacing of the rows and the plants in the row, the proper height at which to thin the plants, the effects of fertilisers on the growth of the plant, and the testing of different varieties as to their suitability for the various districts.

Unfortunately, the climatic conditions in some of the districts have been so irregular and unfavourable to the proper conducting of such experiments that inconclusive results have been obtained in many cases. Sufficient results have been obtained, however, to warrant the continuation of these experiments, and the interest shown by many of the growers in the areas in which the experiments have been located indicate that this is an important phase of the activities of the section.

Grading.

The grading staff, under the able direction of Mr. L. Gudge, has had a very successful season in handling the Durango variety of cotton in the first year that it has been available for general distribution. Prior to this crop, this variety has been grown in segregated areas and all seed cotton produced has been forwarded to the Gladstone ginnery, where the graders received periods of training in the handling of this type of cotton. The efficiency of the manner in which Mr. Gudge has trained the members of the staff in the intricacies of determining the length of the fibres of the cottons received at the various ginneries is amply demonstrated by the relatively small number of complaints received from the growers.

Investigations of the complaints received have shown, for the most part, that the growers have not realised the tremendous effect on the length of the fibres or "staple" exerted by such factors as poorly-prepared seed beds, soil types, irregular rainfall conditions, &c. When a better understanding of these points is reached, it is anticipated that a far greater degree of satisfaction on the part of the growers as to the efficiency of the grading will be obtained.

The unusually dry season since the middle of January over nearly all of the cotton belt, while greatly reducing the yields in several areas, has been of great benefit in producing a very bright, white cotton, remarkably free from stains or tinges of colour. Not only may this be attributed to lack of rain, thereby eliminating the possibility of moisture staining, but also to the absence of certain insect pests and the accompanying fungoid diseases. The result has been that a remarkably high percentage of the crop received at the ginneries was of the top grades. This will be of decided value in assisting in the marketing of the crop, as the bulk of it should arrive in Liverpool before the new American crop is received, and when there is generally a scarcity of white cottons.

Unfortunately, the drought has been so severe in some areas as to affect the length of staple, and consequently there has been some criticism of the Durango variety not producing the length of staple that it generally averages. The consignments of seed cotton of the ordinary variety from these same areas have generally shown a corresponding reduction in length of staple with a consequent lowering in the value of the cotton, so that it appears that while the Durango fibre may have been somewhat shorter than is usually the case, the grower has received more money for it than if he had been growing the ordinary cotton, which in many consignments received the lowest staple class.

Insect Pests and Diseases.

This past season has been characterised by a remarkable freedom from the pests which attack the cotton crop, with the exception of the maize grub (*Heliothis obsoleta*), which in some areas did a considerable amount of damage. This freedom from insect pests has been of enormous value to the crop in that, not only was there no loss of squares and bolls, but the bolls which developed opened well and produced cotton of good quality and free of stains from internal boll rots.

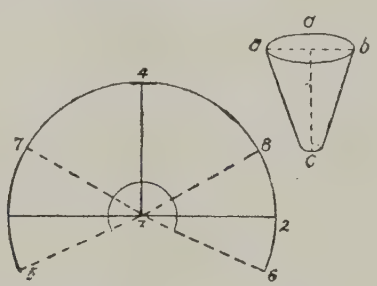
Inspections in the field and at the ginneries have shown that the seed of the crop just harvested has escaped from the attacks of any of the sucking insects to a marked degree as compared to other seasons. This, in conjunction with the consequent freedom of internal boll rot attacks, should make the planting seed for next season's crop some of the best that has been issued.

Mr. Ballard, the Commonwealth Cotton Entomologist, who is engaged in the investigations of the various insects affecting the cotton crop, has obtained some very interesting and valuable information during the past season on several of these insects, particularly the maize grub and the "stainers." In conjunction with these investigations, valuable data have been obtained which show the advantages which accrue from early as compared to late planting of cotton. Not only does the early planting of cotton assist in escaping the effects of the attacks of the maize grub, but the effects of the peach grub (*Conogethes punctiferalis*) are nullified to a great extent. In nearly every case of an attack from the peach grub which has been investigated, it has been found that the crop has been planted late in the season, and this also applies to the maize grub. This was shown this season at the Callide Research Farm, when an early-planted crop yielded around 1,000 lb. of seed cotton to the acre, while a late-planted crop was so badly affected as to not warrant picking.

In view of these results, it is to be hoped that the growers will pay more attention to the early preparation of the seed bed in order that the planting operations can be effected at the earliest moment in the spring after the danger of frosts is past.

SETTING OUT A CONE.

It is often required to set out a cone of a given diameter and depth to be used for such purposes as making a funnel, a cap for a flue pipe, &c. The illustration shows how the sheet metal is to be cut. First of all set out a base line, 1-2, and erect a perpendicular, 3-4. The point 3 is the centre from which the arc required is set out. In the smaller sketch, ab = diameter of the cone, dc = perpendicular height, and eb = slant-height. Suppose it is desired to make a cone 8 inches high and 5 inches in diameter, it will be necessary first to find the slant-height of the cone. Reference to the small figure will show that the slant-height is the hypotenuse of a right-angled triangle, of which the height of the cone is the perpendicular and the radius or half the diameter of the cone is the base. In the cone required 8 inches is the perpendicular, $2\frac{1}{2}$ inches the base, and the slant-height will be found by taking the square root of the sum of the squares on the base and the perpendicular; thus the square root of $2\frac{1}{2}$ v $2\frac{1}{2}$ + 8 x 8 = 8.3, or approximately $8\frac{1}{3}$ inches. Now with the point 3 as centre and $8\frac{1}{3}$ inches as radius, describe the arc 1, 4, 2. It is next necessary



to calculate the perimeter of the cone. Since the diameter is 5 inches and the circumference of a circle is diameter x 3^1, the perimeter will be 5 x $3\frac{1}{7}$, = approximately $15\frac{3}{4}$ inches. Now from the point 4 measure along the arc half this distance, $7\frac{7}{8}$ inches, to the points 7 and 8. Cut out the sector 3, 7, 8, which when bent round will give the required cone 8 inches high and 5 inches in diameter. The sector 5, 4, 6 would give a cone 10 inches in diameter and approximately $6\frac{3}{4}$ inches high, the slant-height, of course, being the same as in the previous case, $8\frac{1}{3}$ inches. In making a funnel the frustrum of a cone is required. In the sketch the smaller arc indicates how the metal would need to be cut. According to this figure the bottom diameter would be approximately $2\frac{1}{2}$ inches, and, of course, the slant-height of the frustrum would be reduced by this amount. If required to provide an opening of definite diameter, say 1 inch, this arc would be described with a radius of 1 inch, and if it is still desired to have the slant-height of the cone $8\frac{1}{3}$ inches, the radius of the larger arc should be $9\frac{1}{3}$ inches, while the perimeter must remain the same as in the previous cases, so that the top diameter will be unchanged.—"Australasian."

POWER ON THE FARM.*

The provisions of adequate supplies of fodder is a question that is increasing in importance every year, but the selection of suitable crops and cultivation methods represents only one side of the question, the other being the efficient, economical production of those crops. At the Producers and Consumers' Conference held at Bathurst recently the question of marketing seemed to be the central thought in the minds of the various delegates. It was a marketing conference, and did not endeavour to cure all the ills of the farmer by discussing improved methods of marketing. Marketing is vitally important, I will admit, but there is too great a tendency to-day among men on the land to attribute all their troubles to a defective marketing system. This, I suppose, is only human nature, as it enables us to put the blame on to somebody else's shoulders when rightly perhaps we should be bearing it ourselves. The point I am driving at is that even with the most efficient marketing system possible we cannot expect our agricultural industries to prosper if our prices be too high, or, in other words, if the cost of production be too high. Our constant aim, therefore, should be to reduce the cost of production by efficient business-like methods and by utilising to the utmost the discoveries and inventions of the scientific and engineering world. Given a good article, produced at a low cost, many marketing problems will solve themselves, but with inefficient and costly production all the marketing schemes conceived by man will never bring prosperity.

Let us consider butter as a case in point. The butter committee at the Bathurst conference came to the conclusion that under basic wage conditions the cost of production of butter is 1s. 11d. per lb. The present system of marketing is efficient and economical, but if the price of butter were increased to return 1s. 11d. per lb. to the farmer it would cost the housewife 2s. 6d. per lb., which we cannot expect to receive.

The one thing to do is to endeavour by various ways to reduce the cost of production, and I wish to say a few words to you on one way which I believe holds big possibilities in this direction, and that is what is known as power farming. There is nothing revolutionary about this; rather, considering the world as we find it to-day, it seems to me but a natural development and one, moreover, that is somewhat overdue unless we are prepared to witness the decline of farming to mere unskilled labour.

When one of our remote ancestors put the idea of tilling the soil into practice it is very difficult to say how he set about it. I think, however, that we can safely say that he either did all the work by hand himself or made somebody else do it for him. The man who first thought of making some long suffering and stupid animal do the heavy work for him made a discovery the importance of which he could not possibly have imagined. He introduced the idea of power to the world. It is tolerably certain that this discovery of power first came about in the agricultural world, and yet we find to-day that all the world over the agricultural industries are the most backward in its utilisation.

For centuries while cloth was all being entirely manufactured by hand, farmers were using power to cultivate their fields. To-day the position is to a certain extent reversed. Cloth is manufactured entirely by mechanical means with mechanical power, while agriculture is still being largely carried on either by hand or by mechanical means with animal power. This wonderful change in secondary industries did not take place in a day. It passed through various stages, but necessity forced manufacturers to adopt mechanical power in preference to animal power. That same necessity is going to force farmers to do precisely the same thing, as animal power is costly and inefficient.

I can see many old and experienced farmers questioning this statement and pointing to this one and that who believed as I do and who were a dismal failure on the land. I will probably be told how motor transport is slipping back and how large numbers of city firms are scrapping their motor lorries and going back to horses. Maybe they are, but I venture to assert that for every motor lorry that is being discarded in favour of horses ten new ones are making their appearance on the road. Every time one goes to the city there seem to be more motor lorries and less horses on the streets than ever.

Farm labour is difficult to obtain and often most unsatisfactory when we get it, and under ordinary conditions we cannot carry on without it. If the farmer is placed in control of a machine that is capable of multiplying his outfit many times he should be practically independent of the labour market.

In considering the possibilities of power farming it has to be remembered that the idea is practically a post-war development and therefore still in its infancy, while men have been tilling the land with horses for centuries. It must also be

* From a paper read by Mr. Lindsay Evans, Dapto (N.S.W.), at the Annual Conference, Hunter and North Coast Branches, N.S.W. Agricultural Bureau.—*Bureau Record* (N.S.W.), 18th November, 1926.

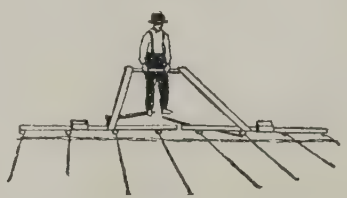
remembered that the efficiency of the farm tractor is capable of being increased to a much greater extent than that of the horse, which has a definite limit beyond which it cannot go, whereas there seems to be a boundless field for research in the improvement of mechanical power. I say a boundless field advisedly, because there are so many distinct fields of research being explored and capable of being explored that affect mechanical power in its application to agriculture. The steel industry, for instance, has made wonderful strides during even the past decade, and there is absolutely no reason to believe that it will not continue to do so. The matter of the provision of fuel is still in the melting pot and the manufacture of power alcohol and benzol as by-products of already established industries in Australia seems to me to be full of wonderful possibilities in the direction of obtaining adequate supplies of very cheap fuel. In the field of engineering inventions, too, there are what can be regarded as more than possibilities for increasing the efficiency of mechanical power. To get right down to bedrock the position is simply a comparison between two machines—a horse and a mechanical invention.

We provide a horse with fuel in the form of feed and in addition to doing our work for us he has to provide for the functions of his body while at work or otherwise and also to roam all over the place with an occasional mad gallop in response to his animal spirits. Consider the wasted energy, all of which we have to pay for, indirectly, by the fuel we supply the machine. Mechanical power on the other hand merely needs fuel while at work and does not or should not carry on any mad capers. The only reason why animal power can compare with mechanical power are: (1) Inexperienced operators; (2) imperfect machines; and (3) more expensive fuels. These obstacles can and will be overcome. Men have been working horses for centuries, whereas farmers, generally speaking, are unused to mechanical power. Machinery is being continually improved, and the improvement will go on while the world lasts. Supplies of fuel will be provided by the development of our resources and the utilisation of waste products; so that the logical outcome is that fuel will be much cheaper than horse feed and the tractor will be able to get the last ounce of efficiency out of that fuel, which an animal can never do out of his feed. Then with all the fuel provided going into work the farmer will simply be compelled to adopt mechanical power for the bulk of his work.

Don't run away with the impression that I am an agent for tractors or oil engines trying to do business or that I am merely a theorist who does not know anything of the practical side of farming. I am just a plain "cocky" and never want to be anything else. I have used horses and still use them and also have been using a tractor for the past two years, and while I recognise that there is still a place for both I have not the slightest hesitation in saying that the power of the future, and the near future at that, for the farmer as for the manufacturer is mechanical power. I know that there are many difficulties and limitations with regard to power on the farm. These can and will be overcome. For the past ten years we have used an oil engine for separating, for the past five years we have used one for chaff-cutting, and for the past two years we have done all our ploughing and many other jobs with a tractor. Our separator engine has cost us about £2 for repairs in ten years, our chaff-cutting engine £1 in five years, while the tractor has not cost us one penny as yet. All of these machines are in tip-top condition, so that you can scarcely blame me for being rather enthusiastic over the possibilities of mechanical power.

GARDEN MARKER.

An easily constructed device that is suitable for marking out rows for the planting of seed or seedlings is shown in the accompanying illustration. With its aid the rows in large vegetable gardens can be marked accurately and quickly. It consists of



a long board with pointed wooden pegs extending from the underside, and a handle by which the device can be pulled. Weights are tied on the marker to keep it down so that the pegs will make a deeper impression. As eight rows can be marked at once, the task of marking a large garden is considerably shortened.—"Australasian."

ANNUAL FIELD DAY AT THE SOUTH JOHNSTONE EXPERIMENT STATION.

At the last annual field day of the South Johnstone Sugar Experiment Station the weather and everything else was most favourable. District canegrowers commenced to assemble about 10 a.m. at the station, which is situated picturesquely on the bank of the South Johnstone River, on the opposite side to the mill. Most of the visitors arrived by motor-car.

After being welcomed by the Director of Sugar Experiment Stations, Mr. H. T. Easterby, an explanation was given of the various experiments that were being conducted on the station, together with the yields of cane and sugar per acre from the different treatment of plots, embracing liming, fertilising, and different methods of planting, subsoiling, and green manuring.

Plate 2.—Farmers Arriving at the Station.

The raising and cultivation of seedling cane varieties were also dealt with. The visitors next proceeded to the field, where detailed information was given by the Director and Mr. P. H. McWalters, the Chemist in Charge, in connection with the experiments and seedlings.

After luncheon, addresses were given by Mr. Edmund Jarvis, Entomologist, on "Insect Pests and their Control," and by the Director on the "Fertilisation of Sugar-cane, and its importance in increasing yields on well cultivated areas."

The afternoon was given to the demonstration of tractors and field implements, and this aroused considerable attention and interest.

The comfort of the visitors was well cared for by Mrs. and Miss McWalters and the staff of the Experiment Station, and at the conclusion of the day a hearty vote of thanks was accorded, on behalf of those attending, by the President of the South Johnstone Shire Council, Councillor Bliss.

PLATE 3.—MR. EASTERBY WELCOMES DISTRICT GROWERS TO THE SOUTH JOHNSTONE STATION.

PLATE 4.—ALONG THE ROWS—INSPECTING SUGAR-CANE EXPERIMENTS, SOUTH JOHNSTONE FIELD DAY.

Plate 5.—Farmers at South Johnstone Field Day Interested in Tractors.

Plate 6.—The Director of Sugar Experiment Stations (Mr. Easterby) Addressing Farmers on the Work of the Bureau.

PLATE 7.—GROUP OF SUGAR-GROWERS AND THEIR FAMILIES AT THE FIELD DAY, SOUTH JOHNSTONE SUGAR EXPERIMENT STATION.

PLATE 8.—AN INTERESTED AUDIENCE OF CANEGROWERS LISTENING TO ADDRESSES ON THE WORK OF THE BUREAU.

PLATE 9.—AROUND THE HEADLANDS—FARMERS LED BY MR. EASTERBY INSPECTING VARIETIES OF SUGAR-CANE, SOUTH JOHNSTONE FIELD DAY.

PLATE 10.—WATCHING THE PLOUGHING DONE BY TRACTORS.
"A 'Busman's Holiday"—Farmers of the South Johnstone casting an expert eye over upturned furrows. Power ploughing at the South Johnstone Station.

Plate 11.—The District's Nerve-Centre—South Johnstone Sugar Mill across the River from the Experiment Station.

Plate 12.—Cane Farmers interested in the Tractor and its Work, South Johnstone Field Day.

PLATE 13.—THE JOHNSTONE RIVER AT INNISFAIL.
This stream with its two branches waters one of the richest regions in Australia.

Photo.: H. W. Mobsby.]
PLATE 14.—THE END OF A PERFECT DAY—LAST HOURS OF 1926—SUNSET, MORETON BAY, QUEENSLAND.

FACULTY OF AGRICULTURE.

GOVERNMENT ENDOWMENT.

Discussing with representatives of the Press the general question of Agricultural Organisation and Education, Mr. W. Forgan Smith stated recently that, as Minister for Agriculture, he had always recognised that the establishment of a Faculty of Agriculture at the University was highly desirable, not only on the teaching and research side but as a general aid to the agricultural industry. He was therefore anxious to assist the University Senate to have the Faculty of Agriculture established and teaching work begun as early as possible. With that end in view he had submitted a proposal to the Cabinet that the sum of £5,000 be allocated to the Senate for purposes in connection with the Faculty of Agriculture. The Cabinet had approved of his proposal, and he was therefore very hopeful that the Senate would be able to establish the Faculty without further delay and have teaching work begun as from the commencement of the 1927 University academic year. Mr. Smith further explained that the fruition of the Government's scheme for the reorganisation of Gatton Agricultural College also made the establishment of a Faculty of Agriculture now possible. In 1923, he said, the Government began its scheme for the reorganisation of the College. Since that date a gradual building-up of staff and equipment had been in progress in order that at a fitting time the College might, amongst other things, be ready to affiliate with the University as a University College of Agriculture, take a definite part in the system of University agricultural education, and, on the practical side, make possible the establishment of a Faculty of Agriculture in the University. That time, explained the Minister, had now arrived, and he felt sure that not only agriculturists but the community generally would be glad if the Faculty could be definitely established in March of 1927.

THE PRODUCTION OF LUCERNE.*

Lucerne has been well named the "King of Fodders"—I think I may say without fear of contradiction that there is nothing that will produce the amount of fodder per acre per annum and of anything like the same quality as lucerne. Either as a milk producer or for fattening quality lucerne stands on its own, due consideration having been given to the manner in which it is fed, and when one considers that when once a crop has been established you can take from six to eight cuts a year off it and it will stand for several years without replanting, I think it justifies its name.

The first consideration for successful lucerne growing is the suitability of the soil, because while it has been said that lucerne will grow in any soil, it cannot be denied that it favours rich alluvial land, and the deeper the better. On a farm which I worked on the Paterson River, where we had an alluvial flat of about 25 acres, the bank had fallen into the river at one place and there the lucerne roots could be seen penetrating the subsoil to a depth of up to 15 feet—in fact, right down to water level—and in other places the same thing applied. A clay subsoil is not desirable for lucerne; it seems loath to penetrate clay, and prefers a light, well-drained subsoil. If a heavy subsoil and one which retains too much water in a wet season is used the crop invariably becomes sickly and yellow and will thin out considerably. This is remarkable, in view of the fact that this crop needs a good rainfall and will sink its roots down to the water level in every case where such a thing is possible.

The importance of using good seed cannot be over-estimated. Fortunately the Government has taken steps to prevent imposition in regard to foreign seed. Good local seed free from seeds of noxious weeds is always desirable, and seed that is not too old, as although lucerne seed will keep for a number of years, new seed will always give stronger and more satisfactory results. New seed can always be recognised by its bright appearance and its plumpness.

The preparation of the soil is a very important matter. Personally I do not favour too deep cultivation for lucerne, as the seed, being very small, is inclined to get too deep if the soil has been cultivated deeply; moreover, the plant seems to thrive best in a solid bed. I have proved this on a plot part of which was ploughed to a depth of, say, 5 inches and the rest only cultivated, after a crop of maize for green feed had been taken off, and for quite two seasons the part that had been cultivated at, say, a depth of 2½ inches showed a better yield. After a flood has covered the soil and left a deposit of several inches of mud it is found that if simply cultivated with a cultivator or skim the results are better than if the land is ploughed.

* From a paper read by Mr. S. T. Parish, Bolwarra (N.S.W.), at the Annual Conference, Hunter and Lower North Coast Branches, Agricultural Bureau, N.S.W.—*Agricultural Bureau Record*, 18th November, 1926.

The best time to sow varies with the seasons and weather conditions, but autumn planting is largely favoured in our district. March and the end of February seems about the best time, as the plant will establish itself before the severe winter weather sets in and will be well ahead of any weeds that may come up in spring, although good results are often obtained from planting in early spring—say, the end of July to the end of August.

Considerable difference of opinion exists in regard to the quantity of seed per acre to sow; it varies from 10 to 20 lb. Of course one must always be guided by the condition of the soil and the quality of the seed, but I think about 12 to 15 lb. per acre is ample. The soil having been worked to a smooth surface the seed should be distributed evenly and then lightly harrowed and rolled down. In sandy loam it is desirable to sow more seed per acre, as there is always a tendency for a certain amount to remain on the surface and thus be wasted, and as a thin plant is never satisfactory it is wise to err on the side of having too much seed than not enough.

The use of fertilisers in lucerne growing has not been demonstrated to any extent in our district. The Hunter River flats are renowned for lucerne growing, and most farmers laugh at the idea of manuring. Still I am not sure that the plant will not respond to the application of fertilisers, especially in the poorer soils. However, I have had had little experience in this matter.

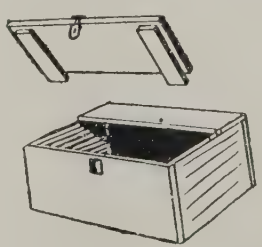
It is a mistake to cut lucerne too young. In summer time, if the weather is favourable, the crop will mature in about five weeks, and this is quite often enough to cut it. It is false economy to cut lucerne when too young, as thereby the plant is "bled," with the result that the next cut will be lighter, and if this practice be persisted in it will have the effect of weakening the plant. Some people turn stock in on the crop and feed it off, but this also has a tendency to thin it out as it will often be eaten down when too young. The correct time to cut it is just when the young shoots are making their appearance at the bottom and before they are sufficiently advanced for harvesting operations to interfere with them to any extent.

The question of drying is one that depends almost entirely on the weather conditions. In extremely hot and dry weather lucerne can be cut and carted to be stacked in the same day, but generally speaking the best method of drying is to rake into rows before it gets too dry and turn it again with the rake and allow it to dry in this way. It may take a little longer, but it is easier and better to handle and load, and also there is less likelihood of loosing the leaf.

During the cooler months and in early spring when the time taken to dry is necessarily longer and when there is more likelihood of showery weather, the question as to whether it pays to stack before too dry and allow the hay to "heat" or to "sweat" may be considered. As far as my experience goes, I do not think that "heating" reduces the feeding value of lucerne hay in any way; in fact, I have known men to prefer brown or sweated hay to dry hay. As regards its keeping, if properly stacked and sweated it will keep for years, but, of course, for market purposes generally hay that has been dried just sufficiently, so that while it retains its green colour it will not sweat, is the most sought after and commands a ready market.

HINGELESS TOOL-BOX.

Although no hinges are used to attach the lid of the tool-box illustrated, it can be locked as securely as if these fittings were employed. The lid is made in two sections, one of which is attached permanently to the box with nails or screws. Two cleats are fastened on the other section, with their ends projecting over one edge,



as shown. When the box is to be closed, the ends are thrust under the fixed section, and the removable section is dropped into position. Almost any type of lock can be used on the box, but a padlock, with hasp and staple, probably is the most suitable. —"Popular Mechanics."

THE PAPAW.

By G. WILLIAMS, Instructor in Fruit Culture.

The Papaw or Papaya (*Carica papaya*), originally reported as being indigenous to Central America and West Indies, is freely distributed throughout coastal Queensland. The small herbaceous tree is practically branchless and surmounted by a crown of large palmate leaves, at the base of which the fruit is produced, this usually maturing after the fall of the foliage from that part of the stem where it is situated. The branchless habit of the tree can be varied by the removal in the early stages of terminal buds, whereby branching is induced and several fruiting heads developed.

The Plant and its Properties.

The succulent flesh is very agreeable to the taste, though preferred by many with the addition of sugar, lemon, or orange juice, the fruit being cut transversely, the seeds removed, and such additions as preferred applied in its capacious cavity. The fruit is credited with containing properties which materially aid digestion, as also are the seeds, which resemble watercress in flavour. The foliage applied as a wrapper is said to have the effect of rendering meat tender—a feature that exists mainly in imagination. From incisions made with a bone or ivory knife in the unripe fruit, the milky juice exudes freely and is collected, dried, and exported from the West Indies and Ceylon to other countries where it is sometimes used as a substitute for pepsin. The demand is said to be limited and irregular.

Under favourable conditions, the first fruit are matured within twelve months from planting, location and rainfall are responsible for variations. The term of productiveness is short, seldom exceeding four years, but this to some extent is compensated by its unbroken continuity.

Cultivation.

Fertile and well-drained soils are essential to successful cultivation. The most vigorous growth is evidenced and the finest fruit produced on volcanic scrub soils. The quality of the fruit varies under different conditions of soil, location, and humidity. Essentially a purely tropical product, the finest fruit are those matured without an excessive moisture. In some of the Northern scrubs Papaws are widely distributed, but under the influences of shade the trees are spindly and the fruit undersized and lacking in flavour. Fruit produced under semi-tropical conditions is admittedly inferior to the purely tropical product.

Varieties.

Various types or varieties have from time to time been introduced into Queensland, but the typical features have by cross-fertilisation been almost eliminated. Two types introduced to the North worthy of mention are the New Guinea or "Long Tom" and the Cowleyii or "New Era" (said to have originated in the Philippines), both being bisexual. The elongated fruit of the former is not quite equal to the latter, but a heavier weight per tree is returned. Earlier introductions were confined to the original unisexual variety, which from a batch of seedlings frequently developed an excess of male and consequently practically unproductive plants, though occasionally the panicles of male flowers are interspersed with those capable of fruit production; the fruit of such are invariably small and inferior. Various suggestions, more or less absurd, have from time to time been published as infallible tests for determining the sex of the young plant, but experience does not favour the acceptance of any of them. Among a batch of seedling plants a wide variation in vigour will be noted, and a reversion of the usual practice of selecting the strongest plants should be applied, for it is found that the most vigorous plants almost invariably turn out to be males.

Planting.

Seeds are planted in boxes or seed-beds under partial shade in early spring, and the young plants are put out when from 8 to 12 inches high, the foliage, except the young undeveloped crowns, being removed, allowing part of the petiole or leaf stalk to remain. Where plants are grown subject to the influences of shade, this should be removed several days prior to transplanting, also water should be withheld, but applied liberally just prior to removing, so that the roots may be mutilated as little as possible. In addition to fertility and good drainage, a soil containing a liberal proportion of humus favours development. No applications of fertilisers to light soils can maintain equal results. Liability or otherwise to frost should be considered in respect to location, for there are few cultivated plants more susceptible to frost

injury than the Papaw. In planting the possibility of numerous male plants is present. The effect to a great extent may be minimised by including in place of one plant two in close proximity, and subsequently removing one when the sex is determinable. If both are males they should be discarded, male trees being entirely superfluous. Six feet part has been given as a reasonable distance for planting, but to this at least 2 feet can be added, with 9 or 10 feet between rows to allow for reasonable development and room for the necessary cultural operations.

Fertility being absolutely necessary, applications of fertilisers should be made in accordance with directions contained in the pamphlet "Complete Fertilisers for Farm and Orchard," issued by the Department of Agriculture and Stock, and obtainable on application to the Under Secretary, Brisbane.

Marketing.

For marketing, sufficient care must be exercised so that the fruit is not bruised when handling, and packing is preferable in shallow trays or cases, so that there will not be undue pressure of fruit. Just at what stage of development the fruit should be gathered will vary according to distance from market and transport facilities, but the nearer the fruit approaches maturity at the time of taking from the tree the more pronounced will be its flavour, and when the market is readily accessible colouring should be evidenced at its apex.

In addition to its place as a dessert and entering into the composition of various condiments, the flesh of moderately mature fruit may by cutting into strips be satisfactorily dried by exposure. It is unlikely that the dried fruit will find a market where fresh supplies are available. The green fruit is utilised as a vegetable, treated and served in the same manner as a vegetable marrow.

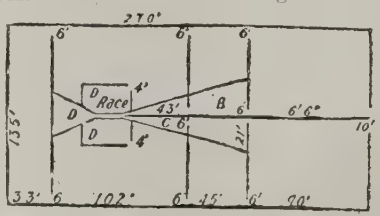
Diseases and Pests Affecting the Plant.

Under fair conditions the Papaw is reasonably free from disease; fungus in Southern districts is sometimes evident on the fruit by discoloured areas of varying extent, causing decay in their vicinity and occasionally affecting the whole fruit. This is preventable by the application of Bordeaux mixture or Bordeaux powder. In some seasons the larva of a moth is persistent in its attacks upon the stem, which it usually enters close to the leaf bases, and may completely destroy the tree; against this it is questionable whether treatment is warranted. Red Spider amongst the young foliage and nematodes on roots are to a great extent attributable to placing plants in unsuitable soils, particularly those of a light sandy nature, though weather conditions adverse to growth are congenial to both pests. Dusting with fine sulphur will have some influence against the former, but remedial measures cannot be profitably applied against the latter.

Being a comparatively shallow rooter, weed growth should be eliminated from plantations and cultivation confined to a shallow depth, varying slightly according to the constituency of the soil, 3 to 4 inches being quite sufficient in that of a close nature.

DRAFTING YARDS.

A request has been made for dimensions of drafting yards for sheep. The dimensions on the plan illustrated have been designed to accommodate from 5,000 to 6,000 sheep, with provision for drafting three ways. AA are two receiving yards, each 90 feet by 67 feet 6 inches; BB are the first two forcing yards; and CC the second two forcing yards. The race is 12 feet long and 18 inches wide, and should



be boarded up and brick or corduroyed. DDD are check pens, two swinging gates each 3 feet long being at the end of the race, with a space of 25 inches between the posts. Ample yards are provided for receiving the drafted sheep. The sizes of gateways are as indicated. Where the dimension is given, it can be taken as being the same as the corresponding one close by, or can be deduced from the figures given on the plan.—"Australasian."

THE LARGE YORKSHIRE.

By E. J. SHELTON, H.D.A., Instructor in Pig Raising.

The Large Yorkshire or Large White is one of the largest of the British breeds of pigs. It has a long and abundant coat of white hair on a white or pinkish skin. This pinkish tinge is characteristic, and shows good quality and breeding; now and then a few blue or dark spots show on the skin; these are undesirable and objectionable.

The breed originated in Yorkshire, England, and has been improved by careful breeding and close attention to feed and housing. Prominent amongst those that devoted the greater part of their lives to the improvement of the Yorkshire type of pig when improvement first began were the Tuleys, Wainmans, Matthew Walker, Lieut.-Col. Cooke, R. E. Duckering, the Earl of Radnor, the Earl of Ellersmere, J. and F. Howard, Sanders Spencer, A. C. Twentyman, D. R. Daybell, and Sir Gilbert Greenall. These breeders exhibited largely at shows, and in many ways popularised and encouraged the breeding of a better class of pig.

Plate 15 (Fig. 1).—A Typical Large White Boar of the Latest English Type.

Note his length, depth, and strength, the comparatively thick coat of fine silky hair, and the strength and boldness of character. Boars of this descriptton are prepotent, active and vigorous withal, masculine in bearing and gait.

The breed is extremely popular in Great Britain and Ireland, and in cold climates generally, where a large heavy bacon pig is required, but in Australia it has not, so far, been widely distributed, and has not gained the popularity for which it is noted abroad. This is not the fault of the breed; it is due largely to prejudice and to the fact that in general the white pig is not as popular as the darker coloured or red pigs, this especially so in the States of New South Wales, Queensland, and South and Western Australia.

Earlier importations also were not altogether of a desirable type; they were long and inclined to be slab-sided; their legs were weak and their progeny were weak constitutioned, and did not acclimatise as well as had been expected. However, recent importations have largely overcome the prejudice to the breed, for they are of a very much better type. Large Yorkshires have never been popular in Queensland except among a few enthusiasts, but in Victoria and in portions of New South Wales they are gaining in popularity, though types that are weak in constitution, have inbent knees, flat sides, and a soft skin which scalds and sunburns badly during the warm weather, are extremely unpopular and unprofitable.

Again the Australian demand has for some years now been for a medium bacon pig that will mature early and be ready for market at from five to five and a-half and six months at around 100 to 125 lb. dressed weight. For this purpose the medium breeds, the Berkshire and the Middle Yorkshire, have been most in demand all along; more recently still, crosses with the Poland China and Duroc Jersey have been tried, while in general the Tamworth Berkshire cross has been largely recommended. Nowadays the Gloucester Old Spot has entered the field and the Large Black; so that, as these latter breeds all resemble the Large White in type and conformation, it is evident that the future of the pig industry here will see considerable competition among what we have become accustomed to calling the "Large" breeds as separate and distinct from the medium types.

For the purposes of our bacon markets, the Large Yorkshire crosses will no doubt prove popular if they can compete for early maturity on even terms with the other breeds and crosses referred to, though overseas experience demonstrates that as a bacon pig the Large Yorkshire and its crosses are much better at around 150 to 160 lb. dressed weight than at 100 to 125 lb. With the possibility of export markets

PLATE 16 (Fig. 2).—A TYPICAL LARGE WHITE SOW, A WINNER AT ENGLISH SHOWS.

Note the fine-quality skin and hair, the well built-up roomy body, the development of teats and udder, and the feminine matronly character of this sow. Large white sows are invariably prolific and are possessed of strong maternal instincts.

opening up, there is the possibility that the Large White will boom ahead in popular favour, though its popularity will have to be gained in very severe competition with the older established and more widely distributed (with us in Australia) breeds—*i.e.*, the Berkshire, the Middle Yorkshire, &c.

The Middle Yorkshire has so far filled the bill very satisfactorily with those who favour a white pig; and as they carry similar valuable characteristics to the Large White and are more suited to our local markets, they will probably be the Large White's most persistent rival. In any case, it will only be the comparatively heavy-coated, firm-skinned, hardy types that will find favour here in the warmer climates of the North.

As will be noted by reference to the extracts from overseas publications, Large Yorkshire crosses have on many occasions been successful in carcass competitions; it is our observation that the crossbred pig gives excellent results; he carries good proportion of high quality flesh intermixed with firm grained white fat; the percentage of offal is light and the bone fine.

Selection of Boar or Sow.

In the selection of boar or sow, special attention must be given to those possessing sturdy constitutions—a quality that is denoted by a wide, deep, capacious chest, width between the ears and the eyes, the forelegs strong, straight, and wide apart, with no sign of inbent, weak knees. The legs must be set well on the outside of the

body, back long and straight, with well sprung ribs, roomy barrel, and deep sides, hams thick and compact, with tail set well upon the rump. Both boar and sow should show twelve to fourteen well-developed teats with a deep level underline; flanks must be deep and loose. The coat of hair must be thick and silky. The head must be well developed, the face slightly dished, the snout of medium length and somewhat pointed, the muzzle broad, the eyes bright and kindly, and the jowl light and running well into the neck. The ears must be of medium size and but slightly inclined forward, and fringed with fine silky hairs. The boar's breeding organs must be well developed—no sign of rupture or of abnormal swellings being allowed to pass without critical examination. Never use a boar showing any weakness in this respect, as any weakness would probably be of an hereditary nature; look for quality both in flesh, skin, and hair, and rigorously cull any stock not coming up to the mark.

There is a tendency in some of the Yorkshire strains to produce a percentage of young stock varying somewhat from the true type. Thus in some strains of Large Whites it has been noted that one or two boars or sows may "throw back" to a heavier, thicker set type resembling the Middle or Small Yorkshire. These animals should not be used for stud breeding purposes, otherwise the result will be unsatisfactory and annoying.

PLATE 17 (Fig. 3).—A PRIZE-WINNING LARGE WHITE SOW IN ENGLAND, "WORSLEY BOURNE QUEEN," 744.

1st and Champion at Royal Norfolk Agricultural Show and 1st and Champion Suffolk and Essex, and 1st other Shows in England. Note her great length and the splendid development of ham and hindquarter generally.

It is only strains that "are prepotent, prolific, vigorous, and contented" that will find a place in our herds.

Large Yorkshires have been bred for more than one hundred years in England. In America they have been styled "the hog that made Chicago." Their great length enables them to carry large litters, and the sows frequently have from ten to fifteen pigs at a litter, with ability to raise them all. The writer has handled one sow that farrowed twenty-one pigs in one litter, of which fourteen were reared, the remainder being weaklings. This sow had a remarkably quiet and easy-going, contented disposition. After close observation under many tests, one of the American experiment stations says of the Yorkshire type: "The pigs of this breed were noted for prolificacy and quick growth. They headed the list in feeding trials, gaining 123¾ lb. in 112 days, and required the smallest quantity of grain feed. The test proved their carcass to be of great length, sides of even depth throughout, and full of flesh; great length between shoulder and ham, fat even on the back, bone moderate, head small, forearm rather long, belly moderately thick, and shoulders moderate in size."

LARGE WHITES ARE PROLIFIC.

Prominent among the characteristics sought after in the selection of breeding-stock are docility, prepotency, and prolificacy. In regard to the former, the Yorkshire breed of pig has often been referred to as the quietest and most contented race of pigs in existence. On this score breeders have no need to fear, for the Yorkshire sow upholds the reputation of the breed in this direction as well as in being prolific; as a breeder and milker the Large White sow yields to none. The breeding record of a noted English herd is eloquent of this recommendation. Records kept covering the birth of 586 pigs showed that 416 were weaned. One sow produced eighty-six pigs in seven litters, of which sixty-seven were weaned, or an average of 12.3 per litter farrowed and 9.6 weaned. Another sow had forty-four pigs in four litters, and weaned thirty-seven of them. Still another had thirty-five pigs in three litters, an average of 11.7, and weaned twenty-nine of them.

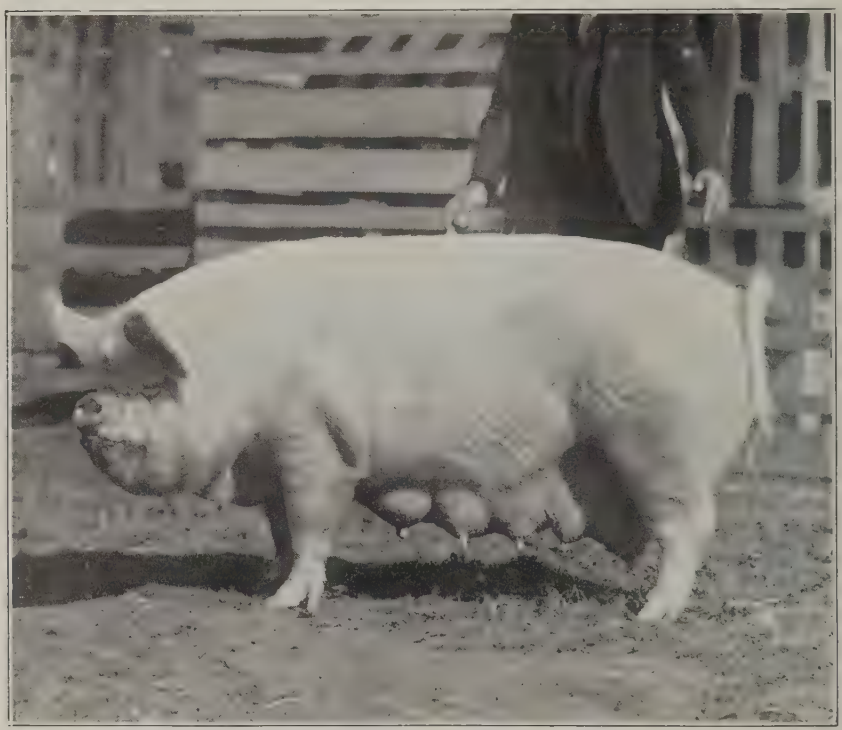


PLATE 18 (Fig. 4).—THE RESERVE CHAMPION MIDDLE YORKSHIRE SOW AT THE ROYAL AGRICULTURAL SHOW, MELBOURNE, VICTORIA, SEPTEMBER, 1926. MR. J. H. THORBURN'S "OATLANDS ENID," 2740.

This photograph of a prize-winning brood sow of the Middle White type is inserted to illustrate the difference in type and conformation between the Large and the Middle Yorkshire breeds. Specially note the head and turned-up snout, the thick more compact body, and the medium instead of large body development.

It frequently happens that sows produce up to eighteen pigs in one litter, while as many as twenty three have been recorded. Although it is not suggested that such large litters are required the Large White sow is a splendid mother, being able to rear strong, healthy pigs, and rear them well. Large Whites—in fact, all Yorkshire pigs—are noted for prepotency and for the powers they have of stamping their type and colour on the progeny no matter what the breed of the sow to whom the boars are mated.

White produces white in quite a remarkable way in the pig world. That pigs of this breed are hardy and vigorous and suited to a variety of climatic conditions is evidenced by the fact that they are bred to-day in such widely-separated and

distant places, as Canada, the United States of America, Russia, Sweden, Denmark, and Switzerland, where winters are of the severest known, and to Africa, South America, China, Japan, India, and to Australia, where summer conditions are much more trying and where the temperatures are higher. The National Pig Breeders' Association of England say it is safe to say that there is no continent in the world to which English breeders have not sent consignments of Large Whites at some time or other. The surest indication, they state, of the popularity of the breed in other countries than England, Scotland, and Ireland, is the regularity with which foreign customers return for further consignments.

The popularity of the breed in England is the result of many years' progressive work in mating, selection, culling, and preparedness on the part of English breeders to adjust their methods to the ever-changing requirements of the consumer. There has always been a sound, level trade for Large White pigs, though this is not to be taken as indicating that this trade has as yet extended to more than one or two spots in Australia. Truer words than that England is the stud farm of the world were never spoken. It is not an idle boast but an actual fact that British breeds of live stock are unsurpassed for type, excellence of quality, prepotency, and hardiness.

Standard of Excellence.

The standard of excellence of the Large White pigs, as recently revised by the Council of the National Pig Breeders' Association, is as follows:—

Head—Moderately long, face slightly dished, snout broad, not too much turned up, jowl light, wide between the ears.

Ears—Long, thin, slightly inclined forward, and fringed with hair.

Neck—Moderately long, fine, and proportionately full to shoulders.

Chest—Wide and deep.

Shoulders—Level, obliquely laid, medium width, free from coarseness.

Back—Long, level, and wide from neck to rump.

Loin—Broad.

Quarters—Long and wide.

Hams—Broad, full, and deep to hocks.

Tail—Set high, stout and long, but not coarse, with tassel of fine hair.

Ribs—Well sprung.

Sides—Deep.

Flank—Thick and well let down.

Belly—Full, but not flabby, with straight underline.

Legs—Straight and well set, level with outside of the body, with flat bone.

Pasterns—Short and springy.

Feet—Strong and even.

Action—Firm and free.

Skin—Fine, white, free from wrinkles, black hairs or spots, and as free as possible from blue spots.

Coat—Long and silky.

THE LARGE YORKSHIRE POPULAR IN OTHER STATES AND IN THE DOMINION OF NEW ZEALAND.

Writing recently a prominent Victorian authority mentions that within the last three or four years the Large Yorkshire pig has made pronounced headway in Victoria. This is evidenced by the increase in the number of breeders of pedigree Large Yorks from four to twelve, and of exhibitors at the Melbourne Royal Show from two to five or more during that period. Victorian breeders have exhibited some very fine specimens of the breed at Melbourne Show, stock the direct progeny of imported parents coming from the leading studs abroad; the imported stock have also competed on several occasions and have been very successful.

It is stated that there has been a considerable amount of perplexity as regards type in Victoria, both by judges at shows and also by purchasers of young stock descended from some of the best and most typical imported parents. The principal contention is the head, which those not familiar with the Large Yorkshire think

should closely resemble that of the Middle Yorkshire. As a matter of fact, it should not, the head of the Middle Yorkshire being shorter and heavier, the ears more upright or pricked, the nose more turned up, and the jowl heavier, as will be noted by a comparison of the standards of excellence.

Prominent exhibitors of Large Yorkshires in Victoria include The Dookie Agricultural College; R. Guthridge, Bianca, Silvan; E. Zelman, Hepburn Springs; Trevor Harvey, Jerseyholme, Boisdale; T. M. Noble and Son, Maffra; and Messrs. T. C. Read, T. L. Webb, and Messrs. Hester Brothers.

The principal breeder of Large Yorkshires in New South Wales is The Hospital, at Gladesville.

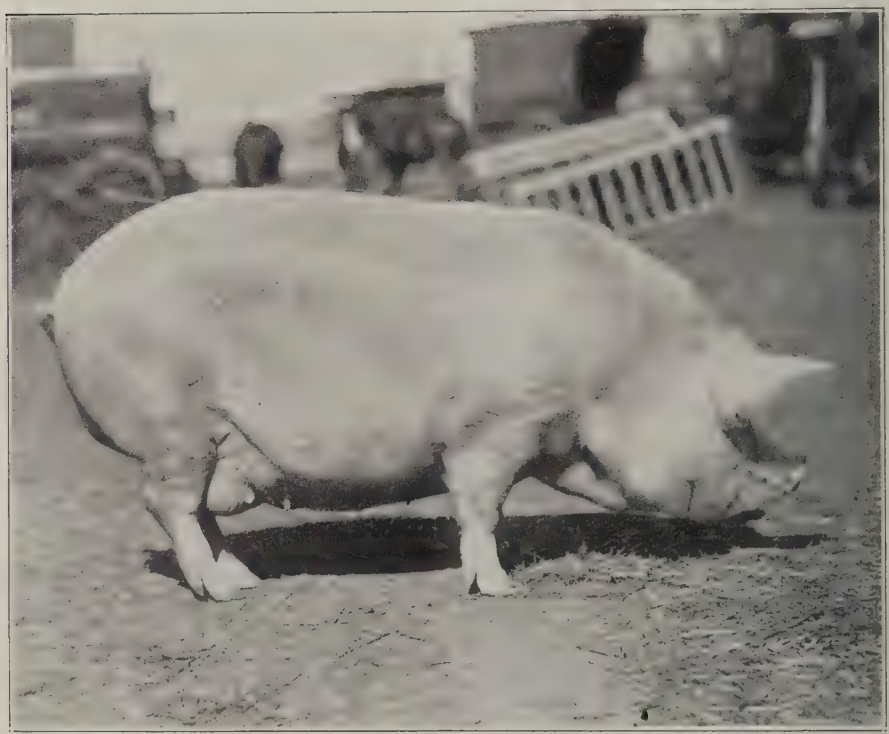


PLATE 19 (Fig. 5).—TREVOR HARVEY'S CHAMPION LARGE YORKSHIRE SOW, "GLADVILLE BARONESS," 3392, MELBOURNE SHOW, 1926.

This sow is the progeny of parents who were the direct representatives of imported stock, and she shows the same characteristic type and development as the photographs of the English types as illustrated in Figs. 1, 2, and 3.

There are no breeders of the Large Yorkshire in Queensland, and no stock have been registered (up to volume 15 of the Herd Book) by breeders in any of the other States.

It might be stated that, in several Australian Royal Show schedules, under the heading of "Breeds," the term Yorkshire refers to the Middle Yorkshire breed, and that where other types of Yorkshires are catered for they are referred to as Large Yorkshires only; there being no Small Yorkshires in Australia at all. We do not use the term "White" at all in referring to either the Large or Middle Yorkshires, though they are referred to officially in England as the Large White and the Middle White; in fact, special reference is made to this in the latest English publications, it being mentioned that the "Large White Yorkshire" pig is now known in England as the "Large White" pig; the "Middle White Yorkshire" pig is now known in England as the "Middle White" pig.

FACTS CONCERNING THE LARGE WHITE PIG FOR BACON PRODUCTION.

In an interesting and attractive brochure published recently by The National Pig Breeders' Association, 92 Gower street, London, W.C. 1, special mention is made of quite a number of important facts about the Large Yorkshire breed; a breed now attracting considerable attention in Australia and New Zealand.

It is suggested, for instance, as being good policy to breed from Large White gilts (young sows prior to having produced their first litter) and sows in order to obtain big litters. It is stated also by the author, Mr. Alec. Hobson, that there is no more popular or better known breed of pig in the world than the Large White. It is universally recognised as the bacon pig par excellence, while its ability to satisfy the varied requirements of the general farmer in this (England) and other countries, justifies the reference it has earned as the "Shorthorn of the pig world." Being extraordinarily prepotent, the Large White pig is used very extensively for the improvement of stock.

What English Curers Say.

Without exception, says Mr. Hobson, bacon-curers throughout the world recommend pig producers to use a Large White boar as the surest means of obtaining the required length of side, with an even proportion of lean to fat, which the discriminating consumer demands.

Discussing the bacon market generally, it has been stated that although pig breeding has always been regarded as an important branch of agriculture, it is only within comparatively recent years that serious attention has been accorded to the question of establishing the pig industry as a whole on a sound footing; this applies equally in Australia also, and particularly in the Northern State.

In regard to the footing which Danish bacon has on the English markets, it is asked what was the first and most important problem with which the Danes were faced when once the broad questions of policy in regard to the English markets had been determined? It was, of course, to find the right class of pig which, when crossed with their native breed, would give them a standard type of animal easily convertible into the lean, sizeable bacon demanded by the English housewife. The fact that the Danish "grading-up" stock has for so many years been drawn entirely from England is as significant as the preference which has always been given to the Large White breed for this purpose.

As regards early maturity, prolificacy, hardiness, and ability to put on flesh at an early age, the Large White, it is claimed on behalf of English breeders, is unsurpassed.

BACON PIG CONTESTS.

Extensive reference is made in the pamphlet "Facts Concerning the Large White Pig for Bacon Production" to numerous bacon pig carcass contests during 1926, in which the Large White has been signally successful. These include successes at the Royal Counties Show, in which Large Whites won the Silver Cup for pen containing the three most typical bacon pigs in the show (in this case the winning trio were Large White-Large Black crosses) the reserve for the Silver Cup, the first, second, and third prizes for the best pen of three bacon pigs of any pure white breed; the first, third and reserve prizes for the best pen of three bacon pigs being the first cross from any pure-breed, the first three prizes in the carcass competition, on which the judge submitted a very favourable report.

In Messrs. Venner & Son's Ideal Bacon Pig Competition for the three best bacon pigs, Large Whites were again successful in winning Silver Cup and first prize, second, third, fourth, fifth (divided), sixth, and the balance up to the tenth prizes awarded. In these contests also the judge's report was very favourable. The carcasses were judged on the following basis: Firmness of fat and quality of meat, 30 points; length of back, 20; leanness of back, 20; thickness of streak, 10; lightness of fore-end, 5; plumpness of gammon (portion of ham here called the cushion), 5; fineness of bone, 5; fineness of rind; up to 10 points deducted for seedy cut, *i.e.*, dark stain in the region of the udders more noticeable in carcasses of black breeds than of white pigs.

In numerous other contests, also, the Large White has acquitted itself favourably including the carcass contests at the Melbourne Show, Victoria, September, 1926.

Additional Remarks by English Bacon Curers.

In a leaflet recently issued by Messers. Marsh and Baxter Ltd., the largest firm of bacon curers in England and perhaps (it is stated) in the world, it is mentioned that "of the numerous pure breeds of pigs kept in this country (England)

the Large White most nearly approaches the ideal bacon pig''; and on the subject of crosses which they recommend, it is important to note that the Large White figures first in each case, *i.e.*—(1) Large White on Middle White; (2) Large White on Welsh breed; (3) Large White on Large Black.

In every case it is stated by Messrs. Marsh and Baxter for the English market the Large White boar should be used. Young sows of the Large White-Middle White and Large White-Large Black crosses if mated with a Large White boar will also yield pigs of an excellent type and such pigs are eminently suitable for feeding for the bacon trade.

In a pamphlet on ''Bacon Pigs'' Messrs. C. & T. Harris (Calne) Ltd., one of the largest of the English bacon curing firms, emphasise the value of the Large White Pig. They recommend the use of the Large White boar for crossing in every case.

From an Australian point of view, of course, it must be remembered that our local demands vary a good deal from those of the English markets. The Large White and its crosses are not well known here as yet. Nevertheless, we require a long, fleshy, early-maturing carcass with well-developed hindquarters and middle piece and a light forequarter, so that doubtless as time goes on, the Large White will find a more extensive sale here and become more popular.

In a letter recently received from the secretary of the National Pig Breeders' Association in England and in referring to the extraordinary successes of the Large White pig in numerous open bacon pig competitions, it is mentioned that the results afford striking evidence of the superiority of this breed in the production of high-class bacon. There are upwards of 800 herds of pedigree Large White pigs in England and the quality of the stock available for export has never been higher than it is to-day.

OTHER REFERENCES TO THE BREED.

In an attractively illustrated informative brochure, ''British Pigs for Profit,'' published by the National Pig Breeders' Association of England, extensive reference is made to the Large White—also sometimes called the Large White Yorkshire—and to the fact that it is not easy to find any complete reference to the early history of this breed, though it is evident the breed can claim direct descent from the native pigs in the county of Yorkshire and surrounding areas. Many are the records, however, of the extraordinary weights to which specimens of the old type of Large White reached. Twelve cwt. 2 qr. 10 lb. has been referred to as being an exceptional achievement, but it is known that at some of the shows held in the north of England during the early years of last century even this phenomenal performance was eclipsed.

Writing in the ''Pig Breeders' Annual,'' Mr. H. G. Robinson says: ''The development of the modern breed is a triumph in the art of selection. One of the pioneers of the Large White was Joseph Tuley, a weaver of Keighley, who probably produced the first specimen that was shown at the Windsor Royal Show in 1851. His exhibits met with great success, and this in turn created a big demand for the 'new sort,' which speedily began to bring what in those days were abnormal prices.''

The Large White as we have him now being extraordinarily prepotent is used very extensively for the improvement of stock, whether the requirements are for pork or bacon. It is referred to in England as being a particularly suitable pig for the small holder who only feeds a few animals at a time, while on the other hand many of the largest pig farms in England, where contracts have been made to supply bacon-curers or pork butchers with regular supplies of stock for slaughter each week, find that the Large White is the most suitable type on account of its readiness to put on flesh, its docility, and the ease with which it can be managed.

Early Maturity.

In early maturity the Large White has made extraordinary progress, and the breed is capable of growing to a tremendous weight. Breeders of the Large Yorkshire claim that it is doubtful whether any breed except perhaps the Middle White can put on more weight for a given quantity of food consumed than this breed. In England the breed is kept principally for supplying the requirements of the bacon market, where a pig is judged according to proportion of lean meat to fat meat which it yields. In the United States of America, where maize is one of the chief foodstuffs for pigs, the packers (bacon-curers and pork butchers) have signified their appreciation of Yorkshires by paying a bonus to the farmer who will breed them.

Bacon—What the English Manufacturers Say.

With its length of side, clean shoulders, fine flat bone, and superior quality, the Large White pig stands pre-eminent as the bacon pig of the world. It is an undisputed fact that the best bacon can be and is produced in England, so that it is not surprising to find the bacon-curers in almost complete unanimity as to the suitability of the Large White or its crosses for their requirements.

In the manufacturing districts of England, Scotland, and Wales there is a big demand for heavy pigs from which large joints of pork can be cut, for this class of meat is one of the staple foods of the manual labourer who needs the sustenance from the fat which such joints yield. It is worthy of note, therefore, that the breed which is principally used to supply this market is the Large White, although it is eminently suited also for the bacon trade where lean meat is needed. It is one of the few breeds which can be fed on to heavier weights at a comparatively early age without undue expense to the feeder.

General Utility.

Further extracts from "British Pigs for Profit" state that the majority of pigs kept by small holders, and even by miners and others working in factories and mills, will be found to be either of the Large White or the Middle White type, if only on account of the economical feeding propensities of these breeds and their production of joints which satisfy the shrewd housewife with many mouths to feed.

Plate 20.—Members of the Jarvisfield School Pig Club in the Ayr District in North Queensland.

Considerable enthusiasm has been created in the Burdekin District as a result of the success of the boy and girl members of the Jarvisfield Pig Club. It has been the means of creating a widespread interest in Pig Raising as an adjunct to the production of Sugar and other crops in Central and Northern Queensland. A movement is now on foot to organise the farmers in the districts concerned to see if it would be possible to raise sufficient pigs to warrant the erection of a bacon factory at Ayr or some other convenient centre.

PLATE 21.—GATHERING AT THE OFFICIAL OPENING AND PRIZE GIVING OF THE MAPLETON DISTRICT SCHOOL PIG CLUB FETE, MAPLETON, DEC., 1926.

The prizes were presented by Mr. J. D. Story, I.S.O., Public Service Commissioner, who is seated to the right of the Chairman (standing at table), Councillor J. T. Lowe, Chairman of Maroochy Shire Council, Nambour, Q. The Instructor in Pig Raising, Mr. E. J. Shelton, is seated next to Councillor Lowe, and immediately in front of the table are grouped the Boy and Girl members of the Mapleton Pig Club.

PLATE 22.—A PRIZE-WINNING BACONER AND HIS OWNER, MASTER KENNETH SENESCALL, AT THE MAPLETON PIG CLUB FETE, MAPLETON, DEC., 1926.

Boys and Girls throughout Queensland are becoming keenly interested in the development of Pig Clubs, of which quite a number have already been formed. Many more clubs will be formed during 1927. Those interested may obtain all information on application to the Organiser and Instructor in Agriculture (Mr. F. E. Watt), Department of Public Instruction, Brisbane, or to the Instructor in Pig Raising (Mr. E. J. Shelton), Department of Agriculture and Stock, Brisbane.

General Notes.

The New Council of Agriculture.

The newly-constituted Council of Agriculture is comprised of thirteen members, of which the list is as follows:—F. H. Hyde (representing the Northern Pig Board), J. Purcell (Butter Board), H. H. Collins (Atherton Tableland Maize Board), G. E. McDonald (Cotton Board), F. H. V. Goodchild (Broom Millet Board), A. McGregor Henderson (Arrowroot Board), J. Archibald (Wheat Board), W. Muir (Peanut Board), H. Keefer (Cheese Board), T. Muir (Canary Seed Board), R. A. Chapman (Egg Board), Geo. Johnson (Queensland Cane Growers' Council), and A. G. Gordon (Committee of Direction of Fruit Marketing).

A Hint to Clean Milkers.

In a short article in a recent "Farm Feeding" (England) was a suggestion that one of the best ways out of the wet-milking difficulty was to get milkers to smear vaseline on the hands before they began to milk. This being a mild antiseptic probably helps to keep the bacterial counts down. It also will have the effect of preventing mammitis, or inflammation of the udder—or garget as it is called in some places—which is caused by the entrance of certain bacteria into the udder via the teat. It is well known that cows which are kept under clean conditions suffer from mammitis much less often than cows kept in a dirty, unhealthy shed. The bacteria which cause the disease, like most other bacteria, thrive in dust and dirt generally, but they can only enter the teat in the milk, and if the teat is always dry-milked the chances of there being a drop of milk left on the end of the teat are greatly minimised. Furthermore, if the teat has become well impregnated with vaseline, as indeed it will, there will be almost no chance for the bacteria to be able to live on the teat at all, for they will be destroyed by the antiseptic.

Milk and Cream Testing—Examination Results.

Following is the result of examination in the theory of milk and cream testing, held at various centres on the 6th November, 1926:—King, Norman J., Taylor street, Buranda; Vogel, Wm. Ambrose, State School, Teviotville; Norris, Herbert Lionel, H.T., State School, Tully; McAllister, Robert John, Agricultural High School and College, T.P.O. South; Grey, Richard Wm., State School, Marmor; Spragg, Wm. George, Station road, Booval; Allen Leonard C., State School, Tarzali, via Cairns; Ferguson, John, Agricultural High School and College, T.P.O. South; Harvey, Fredk. Lawrence, State School, Bracewell; Sigley, Gordon Robert, Agricultural High School and College, T.P.O. South; Spencer, John Cutbush, Agricultural High School and College, T.P.O. South; Price, Reginald Allan, Agricultural High School and College, T.P.O. South; Vidler, Edwin Lyle, Department of Agriculture and Stock, Brisbane; Pommer, Oscar Norman, Agricultural High School and College, T.P.O. South; Young, Wm. Geo., jun., Abbotsford street, Toogoolawah; Horneman, Waldron, Agricultural High School and College, T.P.O. South; Pinwill, Margaret Alexandra, Woodmillar, Gayndah; Taylor, Royston Alfred, care of Land and Income Tax Office, Brisbane; Brecknell, Francis Thos., care of H. Mooney, Martha and Charlotte streets, Paddington; Grace, Daniel Sydney, Agricultural High School and College, T.P.O. South; Warren, Fredk. Jas., Coal Falls, Ipswich; Rauchle, Chas. August Gustav, Leyburn, via Clifton; Green, Reginald Wm. John, Geham; Heath, R. C., Kingaroy; Ferguson, D., Butter Factory, Grantham; O'Keefe, Cornelius Daniel, Reef street, Gympie; Graham, Thomas Gerald, Agricultural High School and College, T.P.O. South; Harris, Chas. W., Box 49, P.O., Beaudesert; Munro, A. C., Box 10, P.O., Toogoolawah; Bird, Alfred Chas., Biggenden; Harper, Wm. Joseph, Moola, via Kainkillenbun; Wenham, Reggie Henry, care of Maclagan Valley Co-operative Dairy Co., Maclagan; Skepper, Leslie Bertram, care of Biggenden Butter Factory, Biggenden; Lynch, Paul Patrick Gerald, Yerra, Gayndah Line; Kyte, Robert H., State School, Mount Appalan, Degilbo; Rauchle, Thos. Charles, Leyburn, via Clifton; Carew, P. V., Boonah; Connolly, John Patrick, Flowerburn, Highfields, via Toowoomba; Hill, L. O., Bororen, N.C. Line; Powe, Alwyn John, Port Curtis Co-operative Dairy Association, Gladstone; Grant, Wm. Macrae, State School, Millaa Millaa; Olsen, Stan., Downs Co-operative Dairy Association, Dalby; Wockner, Jas. Henry, Kulpi, via Oakey; Gilchrist, Cyril Thos., care of J. Hennessy, Ramsay, via Cambooya; Bucheister, Roy N., Wyreema; O'Dempsey, John Thos., State School, Douglas, via Goombungee; Miller, Cecil, Mill Hill, via Warwick; Andersen, Frederick Jessen, care of Butter Factory, Maryborough.

Hatching by Electricity.

Poultry-keepers who have in view reduction of the cost of production are coming to realise more fully each year the value of appliances designed to save labour and simplify the work of the farm. As the heating element in incubators, electricity is more in keeping with modern times than kerosene lamps, for it entirely eliminates the necessity for the constant care and attention which the latter require, the only work left to be done being the usual cooling and turning of the eggs.

It has been claimed that chickens hatched by electricity have more stamina than others, but this statement cannot be substantiated, experience at the College not showing any noticeable difference in development as compared with those hatched in other machines.

The great drawback in the use of current is that it may be cut off at any time as the result of circumstances over which the operator has no control. To guard against this it is advisable to install a lamp-heated system for use in emergency. Hot-air incubators may be easily converted into the dual-purpose type (the lamp system being retained) by anyone possessing an ordinary amount of skill with tools, and without any great knowledge of electricity.—Poultry Instructor, Hawkesbury Agricultural College.

Staff Changes and Appointments.

Constables W. A. Suchting and F. Lewis have been appointed Inspectors of Slaughter-houses.

Mr. H. V. King, of Toowoomba, has been appointed Government Representative on the Darling Downs Dingo Board, and Mr. L. A. Mackenzie, of Telson, Dingo, has been appointed Government Representative on the Leichhardt East Dingo Board.

The following transfers of District Inspectors of Stock and Inspectors of Stock have been approved, to take effect as from the 17th January, 1927:—

District Inspectors of Stock—

S. W. Buhot, from Clermont to Toowoomba;
H. C. Hawthorn, from Barcaldine to Warwick;
L. D. Carey, from Cloncurry to Emerald;
E. J. Tannock, from Emerald to Charleville;
E. C. Lake, from Charleville to Bowen; and
W. C. Woodhouse, from Bowen to Cloncurry.

Inspectors of Stock—

C. E. Ellis, from Crow's Nest to Clermont;
F. R. Dunn, from Pittsworth to Barcaldine; and
H. J. D. McBean, from Hampton to Pittsworth.

Organisation and Marketing Act—Regulations.

Additional regulations have been issued under "*The Primary Producers' Organisation and Marketing Act of* 1926." These are necessary in consequence of the Act named having come into operation on the 1st of the present month, and are more or less copies, with necessary amendments, of the superseded regulations under the old Primary Producers' Organisation Act of 1922.

The regulations provide that at its first meeting the Council shall elect its president, who may be any citizen of Queensland.

The president shall have all the rights and privileges which pertain to membership of the Council. The annual meeting of the Council shall be held after the close of the financial year and during either the months of July or August, and the first annual meeting of the Council shall be held in 1927.

Provision is made for an executive committee and for special committees to deal with such matters as may be referred to them by the Council. No special committee or any member or officer of the Council shall incur any expenditure without the authority of the Council. Agreements and official documents connected with the business of the Council shall be signed by the president or vice-president and be countersigned by the secretary. The fees, allowances, and travelling expenses payable to members of the Council shall be fixed by the Council, but the maximum fees, allowances, and travelling expenses shall be £2 2s. per sitting day, £1 11s. 6d. per travelling day, and first class railway fares.

Every primary producer who desires to be enrolled as a member of a local producers' association shall apply to the secretary of such local producers' association or to the secretary of the Council.

The Council may require returns from commodity boards, and the form of precept by the Council on commodity boards is set forth.

The regulations provide fully for the method of calling and conducting meetings.

Life of a Stand of Lucerne.

The time during which lucerne, once properly established, will continue to yield payable crops will be found to vary with the nature of the soil and subsoil, and the use to which the plants are put. On the best soils, such as the deep, well-drained alluvial soils of the Hunter Valley, the period for which it will pay to crop lucerne before breaking up the ground is much longer than on granitic uplands with an unfavourable subsoil or rock close to the surface. Grazing any kind of stock on lucerne is much more injurious to the life of the plants, owing to the consequent trampling, than removing the cuttings for hay. While, therefore, it may be said that the average profitable life of a lucerne paddock is seven years, this estimate will be found to be the mean between rather wide extremes.

Lucerne gradually dies out, the termination of the life apparently being due to the plants losing their vitality, as all plants do; but the termination of its profit-yielding period is governed by other factors as well. The continuous growth of the one class of crop exhausts the fertility of the soil, although lucerne, unlike clover, does not appear to cause land to become "sick" in the ordinary sense of the term. After the land has been utilised for other crops for a time it can again be successfully laid down to lucerne.

How to Get the Best Out of Your Job.

Respect it.
Take pleasure in it.
Don't feel above it.
Put your heart in it.
See the poetry in it.
Work with a purpose.
Do it with your might.
Go to the bottom of it.
Do one thing at a time.
Be larger than your task.
Prepare for it thoroughly.
Do it cheerfully, even if it is not congenial.
Do it in the spirit of an artist, not an artisan.
Make it a stepping-stone to something higher.
Endeavour to do it better than it has ever been done before.
Do not try to do it with a part of yourself, the weaker part; be all there.
Keep yourself in condition to do it as well as it can be done.
Believe in its worth and dignity, no matter how humble it may be.
Accept the disagreeable part of it as cheerfully as the agreeable.
Choose the vocation for which Nature has fitted you.
See how much you can put into it instead of how much you can take out of it.
Remember that it is only through your work that you can grow to your full height.
Train the eye, the ear, the hands, the mind—all the faculties—in the faithful doing of it.
Remember that work well done is the highest testimonial of character you can receive.
Use it as a tool to develop the strong points of your character and eliminate the weak ones.
Remember that every vocation has some advantages and disadvantages not found in any other.
Regard it as a sacred task given you to make you a better citizen, and to help the world along.
Remember that every neglected or poorly done piece of work stamps itself ineffaceably on your character.
Write it indelibly in your heart that it is better to be a successful cobbler than a botched physician or a briefless barrister.
Refuse to be discouraged if the standard you have reached does not satisfy you; that is a proof that you are an artist and not an artisan.
Educate yourself in other directions than the line of your work, so that you will be a broader, more liberal, more intelligent worker.
Regard it not merely as a means of making a living, but first of all as a means of making a life—a larger, nobler specimen of manhood.—O.S.M. in "The Dawn."

Tuberculosis in Pigs—Control Measures.

There is no practical method of treatment of tuberculosis in animals, but by attention to the following precautions the disease may be kept under control:—

As cattle are the main source of infection, the tuberculin test should be applied to the herd and all reactors removed.

Do not allow pigs to roam about pastures and yards used by cattle unless it is definitely known that there is no tuberculosis in the herd.

All skim milk and other dairy products should be heated to 180 degrees Fahr. and kept at that temperature for fifteen minutes before being fed to pigs.

All refuse, slaughter-house offal, and similar food should be boiled before it is given to pigs.

Where tuberculosis is found to be present in the herd, all suspected animals should be slaughtered, and where this is done under qualified supervision the carcases which have only a slight infection of the head glands will be passed for human consumption, the affected parts only being condemned. The pens should be thoroughly disinfected and limewashed, disinfectant being added to the lime. All litter and rubbish in the yards should be burned and the ground loosened and treated with quicklime.

Fresh air and sunlight are great enemies of the tubercle bacillus. Hence pens and sties should be open and airy, and have no damp dark corners to which the air and sun cannot penetrate.

Some Rules for Feeding Horses.

Perhaps the commonest cause of colic is giving horses food to which they are not accustomed. A sound physiological reason exists for not doing this. It has been proved that the character of the food influences the quantity and quality of the gastric pancreatic juices. A definite and constant diet produces juices capable of digesting it, but utterly incapable of dealing with sudden changes of food. Under proper conditions, no food will cause colic, although some (as, for example, wheat and barley) are more indigestible than others; but many foods will do so if given in excess, or at the wrong time, such as giving lucerne to a horse that has been starved for a time. Horses can be made to exist on practically any food that is digestible, provided they are gradually accustomed to it; but to give a horse a full feed of, say, maize, if he has never had the grain before, is to invite digestive troubles that may cause death. Again, grass-fed horses suddenly put on to dry feed on being taken on a long journey get colic, owing to the sudden change of food.

If you wish to avoid colic, give food at regular intervals, and see that the food is of good quality and of proved dietetic value. Mouldy corn, damaged oats, or musty hay very often produce colic, while proprietary foods of unknown composition, and frequently of doubtful feeding value also, often do a great deal of harm. Do not give green forage in an immature, fermented, or over-ripe condition.

Bran mixed with maize is a favourite food, but it is much too laxative for a horse in work, and is a frequent cause of an attack of colic. Do not give large quantities of bran to a working horse. Bran is a good laxative food, especially during periods of rest; but its nutritive value is practically nil owing to all the flour having been extracted from it.

Do not suddenly alter the amount of food given. It is a common practice to have horses fed up for a day or two prior to severe work, and this causes much intestinal trouble, such as stomach staggers.

Never forget that young horses cannot digest as much corn as old ones. Horses when rested, even for a day or two, should have their food, especially corn, reduced. Failure to do this is the cause of much colic.

Another common cause of repeated slight attacks of colic, especially with working horses on farms, is the dry, rough, coarse, and indigestible nature of the herbage found in many paddocks. Too much coarse food prevents digestion by reason of its irritative effect on the stomach. A certain amount of bulky fodder increases the digestibility of the more concentrated foods, such as oats, but too great a quantity of such food greatly weakens the power to digest. A good example of the results of this is seen in so-called "wild melon poisoning." The horse's stomach is not adapted for the digestion of coarse food, and any coarse food that it eats is digested in the large intestines. Farm-horses, as a rule, eat far too much rough bulky fodder, and many suffer in consequence. A working farm-horse does not require more than 12 lb. of hay a day, and the rest of the ration should be made up of grain, such as oats, or half oats and maize.

Milk Secretion—Interesting American Experiments.

Interesting studies in relation to the process of manufacture of milk by the dairy cow are referred to in a news bulletin of the Federal Department of Markets and Migration, Melbourne.

The udders of two cows killed at the United States Government's dairy experiment farm were removed immediately after slaughter and mounted in a position for post mortem milking in a test to determine whether milk is manufactured during the few minutes required for the milking process, as is generally taught, or whether it is secreted continuously and collected in the udder previous to milking.

It is quite generally held that the capacity of a cow's udder is not more than a half pint to each quarter, and, therefore, half the milk must necessarily be manufactured during the milking operation. In these tests it was found, however, that a cow's udder is capable of holding from 11 to 20 quarts of milk. One of the cows had normally been giving about 12 lb. at a milking. When her udder was milked after being completely severed from all body connections a total of 10.27 lb. of milk was obtained, or more than 85 per cent. of her normal production, indicating that this amount had been collected and stored as milk previous to her slaughter. The post-mortem milking of the second cow yielded practically 50 per cent. of her normal production. A considerable quantity of milk still remained, due to the difficulty with which it was released.

In the opinion of officers of the Bureau of Dairy Industry, these tests indicate that milk secretion is to a considerable extent a continuous process, and that a large proportion of the milk secured at any milking is collected and stored within the mammary gland before milking is commenced; also that the liberation of the milk from the gland is not dependent either upon a nervous or mechanical stimulation or upon internal muscular contraction.

Extensive studies of the mammary gland are being made by the Bureau in connection with the relation of a dairy cow's conformation and anatomy to her milk and butter-fat-producing capacity.

SUBSCRIPTIONS TO THE JOURNAL.

Subscribers are reminded that when a cross is placed in the square on the first page of the Journal it is an indication that the term of their subscription ends with the number so marked, and that it is advisable to renew immediately if they desire the retention of their names on our mailing list.

To farmers, graziers, horticulturists, and Schools of Art the annual subscription—one shilling—is merely nominal, and the charge is only imposed to cover the cost of postage. To them, otherwise, it is an absolutely free issue. Members of agricultural and similar societies who are not actively engaged in land pursuits are asked to pay five shillings a year, while the annual subscription charged to the general public is ten shillings.

Farmers particularly are urged to keep their names on our mailing list, for through the Journal they may keep themselves well informed in respect to the activities of the Department, and other matters with which they are directly concerned. Instead of sending just the annual subscription along it is suggested that, when renewing it, they do so for a longer term. For instance, five shillings would keep their names on our subscribers' register for five years. By doing this they would obviously help to reduce clerical labour as well as avoid the inconvenience to themselves of posting annually the very small sum necessary to keep their names on our mailing list.

On another page an order form may be found, and for those whose annual subscription is about due what is wrong with filling it up now and posting it direct to the Under Secretary, Department of Agriculture and Stock?

Italy to Study Export Markets.

It is reported that the Italian Government has declared its intention of setting up a bureau to aid Italian export trade. This bureau will be known as the National Institute for Export. It is believed that its main object will be the scientific study of foreign markets. It is also reported that during the last few months the tariff on raw materials not produced in Italy has been greatly reduced.

The Demand for Honey.

While honey was known and used in biblical days, long before sugar was thought of, it is only in recent years that its use in the home has become widespread. Its food value as against many of the ordinary sweets and its utility in recipes have been factors influencing its use.

Thus in the last ten years the production of honey has doubled in America, and an enormous export business in this product has developed. In both home and foreign markets the demand is tending toward liquid honey rather than comb. The reasons for this are many, chief among them being convenience in serving, neatness of appearance, production of standardised blends, and, from the manufacturer's standpoint, a better opportunity for branding.

According to a New York firm of manufacturers of machinery for the treatment and blending of honey, more and more honey is being sold every year in America in glass jars with a standard label. This practice, it is stated, raises the question of the standardised product. The following description is given of how honey is standardised by one of the large American blenders.

After the honey has been extracted it comes to the plant in 5-gallon cans, a net weight of 60 lb. These cans are set in a room that is heated by steam pipes, and are inverted on a trough. As fast as the honey liquefies it runs out of these troughs into a wide, flat, glass-lined tank, which has a hot-water jacket. Here the honey is allowed to thoroughly purify itself, through skimming. When the temperature of the batch has risen sufficiently it is pumped into glass-lined filling tanks. Then the product is heated to a fairly high temperature, usually 155 to 160 degrees, which is suitable for filling the glass jars. The tanks are equipped with Monel metal strainers to remove any final impurities.

Contrary to common belief, liquid honey is not honey strained from mashed-up honeycombs. It is produced by subjecting the combs to a process in which the fluid is thrown out by centrifugal force. The machine used for extracting it has a mechanically-vibrated, steam-heated knife for uncapping the combs of honey. A boiler furnishes steam to this knife. Then there is the honey extractor which whirls the uncapped combs, and empties them as described, leaving the combs intact to be filled again by the bees. There is also a receptacle for draining this honey from the cappings, and a pump which transfers the honey from the bottom of the extractor to the glass-lined blending and filling tanks.

The time required for complete liquefying and blending depends considerably upon the condition of the granulation and the temperature at which the honey is originally put into the liquefier.

Practice varies as to the temperature to be used in filling, and some operators run the product up to higher temperatures than 160 degrees, in which case the use of a special agitator to prevent scorching is very important. Improper processing in plain metallic equipment is apt to ruin the delicate flavours.

The glass-lined feature of the equipment is very important in cleaning. Merely heating up the tank slightly melts any honey deposits, and a hot water or steam hose rinses out the tank very thoroughly.

It is considered by the firm referred to that with standardised, blended brands on the market it only remains for intensive advertising to put honey on the table of practically every American family. They point out that many food authorities recommend the daily use of honey, and that they have backed up their statements by elaborate research and investigation. The following statement regarding the food value of honey is credited to one of the most eminent of these medical authorities:—

"In an examination into the digestibility of honey, it was found that bread with honey was digested and left the stomach as quickly as bread alone, although the addition of the honey had practically doubled the food value of the product from the energy standpoint. The use of honey with bread, and in similar ways, would, therefore, appear to be generally preferable in the case of children to the eating of sweets. Honey serves to make a highly nutritious bread more palatable, leading to a greater consumption of body-building foods, instead of depressing the appetite, as is likely to be the case with sweets which are eaten between meals. At the same time, honey furnishes to the body very considerable amounts of energy in the most available form. The high place given to it in the diet is well deserved."

DUSTING WITH CALCIUM CYANIDE FOR BANANA THRIPS CONTROL.

By JOHN L. FROGGATT, B.Sc.

As a result of earlier observations made on the life history and control of the banana thrips (*Anaphothrips signipennis* Bagnall) dusting with sulphur and pyrethrum powder was recommended for its control. Further study of the control aspect of the problems, however, led to preliminary trials with other materials, included amongst which was calcium cyanide; these tests indicated that with this latter chemical quicker and more certain results could be obtained than was the case with either of the two previously recommended.

The preliminary trials with calcium cyanide were made in the Gympie area in April, 1926, and in the Innisfail area in May of the same year. The results were so promising that field trials were laid down in the latter district towards the end of October, 1926.

HABITS OF THE THRIPS.

Before dealing with the details of the field trials, it may be advisable to give a brief résumé of the habits of this insect, as they bear directly on the scheme of control work laid down.

The eggs are deposited in the plant tissue, and the larvæ on emerging form colonies with some of the adults; these colonies are found both on the pseudostem under the leaf-sheaths, and on the fruit in the bunches, especially in the base of the hands. The larvæ when full fed travel down into the soil where they pass through the pupal (or chrysalis) stage; the adults, after emerging, crawl back on to the plant to carry on the next generation.

LETHAL ACTION OF CALCIUM CYANIDE.

On exposure to air, calcium cyanide gives off hydrocyanic or prussic acid gas which acts extremely rapidly and is very deadly to the thrips. The preliminary trials showed that a light cloud of the dust on an exposed colony of thrips will destroy every individual comprised in it within five to ten seconds, and if the dust be blown lightly upwards under the opening bracts on a young bunch, four to five seconds will suffice to kill every thrip present under the bract, or in a young hand of fruit.

FIELD TRIALS TO DETERMINE THE PRACTICABILITY OF DUSTING ON A PLANTATION SCALE.

Two trial plots were laid down in different parts of the Innisfail district; the arrangement being the same in each case. In the first plot the stools were over two years old and were carrying a considerable amount of fruit; in the second plot, the stools had, for the most part, not thrown their first bunches.

Each plot was divided into three sections of fifty stools arranged in five rows of ten stools, with two rows of ten stools between the sections to act as check rows.

In plot 1 the area had not been chipped for some time, although spraying the weeds with arsenic solution had been done. In plot 2 the area had been recently chipped, and was again chipped on 26th October. The differences in cultivation accounted, in part at least, for certain differences in results obtained in the two plots.

Climatic conditions over the period of the trials were hot and dry until 16th November, when muggy, showery conditions prevailed until the 23rd November.

The dusts used in the preliminary trials were calcium cyanide "A" and "B" dusts, the latter containing sulphur, but as the "B" dust showed no advantage over the "A" dust in these early small scale trials, it was not included in the field trials in October. The stems and bunches were dusted with calcium cyanide, but, in order to determine the action, if any, of soil treatment on the soil-frequenting stage, the trials were extended to include soil fumigation; calcium cyanide flakes and paradichlorobenzene were tested for that purpose.

When the trials were instituted in October thrips were fairly numerous and showed a marked increase in numbers in the first fortnight of November.

On plot 1 treatments were given on the 21st and 29th October and on the 8th November, and the final examination was made on the 17th November. On plot 2 treatments were given on the 26th October and on 2nd and 12th November, and the final examination was made on 19th November.

DETAILS OF TREATMENT.

In all sections of the two plots, the stems and bunches were dusted with the "A" dust, one pound doing about two hundred and fifty stools; in addition to the dusting of stems and bunches, soil treatments were applied in two sections, as follows:—

In section 1 of each plot, half an ounce of calcium cyanide flakes was buried in the soil at a depth of 3 to 4 in., and about 6 in. out from the base of the plant. In section 2 no soil treatment was used. In section 3, half an ounce of paradichlorobenzene was buried in the soil at a depth of 3 to 4 in. and about 6 in. out from the base of the plant.

The soil treatment was carried out by digging two or more holes to the required depth round the plant, and distributing the dose between them; the holes were then filled in, and the soil pressed down with the foot.

Dusting was carried out with a hand bulb-blower, the rubber bulb being about 4½ in. in maximum diameter, and the neck being fitted with a rubber stopper through which projected a length of copper tubing about 6 in. long and $\frac{3}{16}$ in. in diameter. In operation the neck of the bulb is held in one hand to obtain direction of the blast, while the bulb is rotated and pressed with the other hand; in this way a steady stream of dust can be maintained, and directed as desired. When dusting the stem each lower leaf-sheath was drawn slightly away so as to permit of the dust being blown well down towards the base, and then let return to its original position.

Only a dust-cloud should be blown onto the plants and fruit; if proper care is not exercised and a coating of powder is left on the fruit, scalding will result due to the quicklime produced by the chemical decomposition of the calcium cyanide as expressed in the following formula:—

Calcium cyanide + water yields quicklime + "prussic" acid

$$Ca(CN)_2 + H_2O = CaO + 2HCN.$$

The results obtained in both plots were very similar but were rather more striking in plot 2 than in plot 1. The final examination of both plots showed that in section 1 only an odd small colony was noted and the number of thrips present was very low. In section 2 only an odd small colony was observed, although the number of thrips present was somewhat higher than was met with in sections 1 and 3. In sections 3 only an odd small colony was present and the number of thrips, although slightly higher than in section 1, was comparatively low. In no case in any of the treated sections were thrips generally numerous. In the untreated check rows, colonies, often large, were found on practically every stool and bunch, and the number of thrips present was high.

It was evident that thorough and systematic dusting of the stems and bunches, even without soil treatment, greatly reduced the thrips population. The details of the results of the examinations of the field plots will be found in the two tables accompanying these notes.

COST OF TREATMENT.

Calcium cyanide "A" dust and calcium cyanide flakes are sold at the present time in Brisbane in tins at the rate of 8s. for 5 lb. As 1 lb. of dust should do at least 252 stools, the cost is approximately 9½d. per 100 stools per treatment. The calcium cyanide flakes, at the rate of half an ounce per stool, cost 5s. per 100 stools per treatment, and paradichlorobenzene at the rate of half an ounce per stool works out at 4s. 8d. per 100 stools per treatment.

For dusting stems and bunches one operator should do 50 stools per hour or slightly over an acre per day in plantations where the stools have been planted 12 ft. by 12 ft. apart. With a combined dusting and soil treatment a little less than one acre per day per man should be completed under the above conditions.

CAUTION TO BE OBSERVED IN DUSTING.

It must always be borne in mind that calcium cyanide is poisonous, and must, therefore, not be handled carelessly. Care should be taken, when dusting, to so arrange the work that the operator is moving up into the wind as much as possible, so that the dust is being blown away from him. The hydrocyanic acid gas is liberated at a comparatively slow rate, and thus allows a margin of safety. The principal danger lies in the inhalation of the dust in breathing, but this may be readily avoided by the exercise of a little forethought.

FIELD APPLICATION OF THE TREATMENT.

As a result of these trials and from other observations made, it would appear that treatments should be made at intervals of not more than three weeks apart for the effective control of the banana thrips.

Treatment should be commenced as soon as the flower-bracts lift off the hands on the young bunch, or even a little before the bunch is thrown.

The most effective control is obtained by dusting the bunches and "stems" under the leaf-sheaths with calcium cyanide "A" dust combined with burying half an ounce of calcium cyanide flakes in the soil at a depth of 3 to 4 in., and at a distance of about 6 in. from the base of the plant, the dosage of flake cyanide being divided into two or three parts.

Even without soil treatment, dusting of the "stems" and bunches will give a very marked measure of control.

ACKNOWLEDGMENTS.

In conclusion acknowledgement must be made of the great assistance received from those growers who so readily co-operated in every way possible in carrying out the field trials.

KEY TO TABLES.

In the tables showing the results of the field trials with calcium cyanide dust for banana thrips control, the following symbols have been used:—

S. For stem.

B. For bunch.

1. For odd adults but no colonies.

2. For thrips numerous.

3. For small colonies.

4. For large colonies.

x. For stool missing.

s. For thrips scarce.

vs. For thrips very scarce.

S. 3.1. Signifies small colonies composed of a few individuals.

S. 3.2. Signifies small colonies composed of a number of individuals.

The above symbols apply to both plots.

In plot 1, if there is more than one numeral after B, each refers to a separate bunch.

PLOT No. 1.

	Check.		Section III.					Check.		Section II.					Check.		Section I.				
Row.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
A	x.	x.	x.	S. 1.	S. 1.	S. 1.	S. 1.	S. 3. B. 3.	S. 3. B. 1.3.	S. 1. B. 1.1.	S. 1. B. 1.	S. 1. B. 1.3.	S. 1. B. 1.	S. 1. B. 1.1.	S. 3.2.4.	S. 1.2. B. 3.3.	S. 1. B.1.1.1.	S. 1. B. 3.	S. 1. B. 3.1.	x.	S. 1. B. 1.
B	S. 3. B. 3.	S. 3. B. 3.	S. 1. B. 1.	S. 1.	S. 1. B. 1.1.	S. 3.2.	S. 1.	S. 1.	S. 1.3. B. 3.3.	S. 1. B. 1.	S. 1. B. 1.1.	S. 1. B. 1.	S. 1.	S. 1. B. 1.1.	S. 1.	S. 3. B. 3.3.	S. 1. B. 1.1.	S. 1.	S. 1. B. nil	S. 1. B. 1.1.	S. 1.3. B. 1.
C	S. 3.1. B. 3.	S. 3.2.	S. 1.2.	S. 3.1.	S. 1.	S. 1. B. 1.1.	S. 1. B. 1.1.	S. 3.2. B. 3.3.	S. 3. B. 1.	S. 1. B. 1. nil	S. 1. B. 1.1.	S. 1. B. nil	S. 1. B. 1.3.	S. 1. B. 1.3.	S. 3.	S. 1. B. 1.	x.	S. 1.	S. 1.	S. 1.	S. 1.
D	S. 3.2. B. 1.	S. 3.2.	S. 1.	S. 1.	S. 1.	S. 1.	S. 1. B. 1.1.	S. 3. B. 3.2.	S. 3. B. 1.1.	S. 1. B. 1.1.	S. 1.	S. 1. B. 1.	S. 1.	S. 1. B. 1.	S. 1.	S. 3.	S. 1. B. 1.	S. 3. B. 1.	S. 1.	S. 1.	S. 1.
E	S. 3. B. 3.	S. 3. B. 3.	S. 1. B. 1.	S. 1. B. 1.1.	S. 3. B. 1.	S. 1.	S. 1. B. 1.	S. 3. B. 3.	S. 3.2. B. 3.	S. 1.	S. 1. B. 1.1.	S. 1. B. 1.1.	S. 2. B. 3	S. 1. B. 1.	S. 3. B.3.3.	S. 3.	S. 1.	S. 1. B. 1.3.	S. 3.	S. 1. B. 1.	S. 1.
F	S. 3.2.	S. 3.	S. 1. B. 1.	S. 1. B. 1.	S. 1.	S. 1. B. 1.	S. 1. B. 3.1.	S. 3.	S. 3.2. B. 3.	S. 1.	S. 1. B. 1.	S. 1.	S. 1.	S. 1. B. 1.	S. 3. B. 3.	S. 2.3. B. 3.3.	S. 1. B. 1.	S. 1.	S. 1. B. 3.	S. 1.	S. 1.
G	S. 3.	S. 1.	S. 1. B. nil	S. 1. B. 1.	S. 1. B. 1.1.	S. 1. B. 1.1.	S. 1.	S. 3.	S. 3.2. B. 3.3.	S. 1.	S. 1.	S. 1. B. 1.1.	S. 1. B. 1.	S. 1. B. 1.1.	S. 1.	S. 1.	S. 1. B. 1.	S. 1.	S. 1. B. 1.	S. 1.	S. 1.
H	S. 3.	S. 3.2. B. 1.3.	S. 1. B. 1.1.	S. 1.	S. 1. B. 1.1.	S. 1. B. 1.	S. 1. B. 3.	S. 3. B. 3.	S. 1.	S. 1. B. 1.1.	S. 1.	S. 1. B. 1.	S. 1. B. nil	S. 1.	S. 3. B. 3.	S. 3.2. B. 3.	S. 1.	S. 1. B. 1.	S. 1.	S. 1. B. 3. nil	S. 1.
I	S. 3.	S. 1. B.1.3.3	S. 1. B. 1.	S. 1. B. 1.	S. 1. B. 1.	S. 1.	S. 1. B. 1.	S. 1. B. 1.	S. 1.	S. 1.	S. 1.	S. 1.	S. 1. B. 1.	S. 1.	S. 4.	S. 1. B. 3.	S. 1. B. 1.1.	S. 1.	S. 1. B. 1.	S. 1. B. 1.	S. 1. B. 1.
J	S. 3.	S. 1.	S. 1. B. 1.	S. 1.	S. 1. B. 1.1.	S. 1. B. 1.1.	S. 1.	S. 3.2.	S. 3. B. 3.3.	S. 1. B. 1.	S. 1.	S. 1.	S. 1. B. 1.	S. 1. B. 1.	x.	S. 1. B. 1.	S. 1. B. 1.	S. 2.	S. 1. B. 1.	S. 1. B. 1.	S. 1.

PLOT No. 2.

Row.	Check.		Section III.					Check.		Section II.					Check.		Section I.				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
A	S. 3.1.	S.3.2.	S. 1.	x.	S. 1.s.	S. 1.s.	S. 1.	S. 3.2.	x.	S. 1.	S. 1.	S. 1.	S. 1.s.	S. 2.	S. 3.2. B. 3.	S. 3. B. 3.	x.	S. 1.	x.	S. 1.vs.	x.
B	S. 3.	S. 3.	S. 1.	S. 1. B. 3.1.	S. 1.	S. 1.	S. 1.vs.	S. 4.	S. 4.	S. 1.	S. 1.	S. 2.	S. 1.	S. 1.	S. 3.2.	S. 2.	S. 1. B. 1.s.	S. 1.s.	S. 1.s.	S. 1.s.	S. 3.1.
C	S. 4.	S. 4.	S. 1.	S. 1.	S. 1.s.	S. 1.	S. 3.1.	S. 3.1. B. 3.2	S. 3.2.	S. 1.	S. 1.	S. 1.	S. 1.	S. 2. B. 3.1.	S. 3.2.	S. 3.	S. 1.s. B. 1.s.	S. 1.	S. nil	S. 3.1.	S. 1.
D	S. 3.2.	S. 4.	S. 1.	S. 1.	S. 1.s.	S. 3.1.	S. 1.	S. 4.	S. 3.2.	S. 1.s.	S. 1.	S. 1. B. 3.	S. 1.	S. 1.	x.	S. 3.	S. 1.	S. 1.s.	S. 1.s. B. 1.s.	S. 1.vs.	S. 1.vs.
E	S. 3.2.	S. 3.	S. 1.	S. 1.	S. 1.	S. 1.vs.	S. 1.	S. 3.	S. 3.	S. 1.s.	S. 1.s.	S. 1.s.	S. 1.vs.	S. nil	S. 3.	S. 3.	S. nil	S. 1.vs.	S. 1.s.	S. 1.vs.	S. 1.vs
F	S. 3.	S. 1.	x.	S. 1.	S. 3.1.	S. 1.s.	S. 1.	S. 3.	S. 3.	S. 1.s.	S. nil	S. 1.s.	S. 1.s. B. nil	S. 1.	S. 2.	S. 3.	S. nil	S. 1.vs.	S. 1.s.	S. 1.	S. 1.vs.
G	S. 3.2.	S. 1.	S. 1.	S. 3.1.	x.	S. 1.	S. 1.s.	S. 3.	S. 3.2.	S. 1.s.	S. nil	S. 1.	S. 1.	S. 2.	x.	S. 3.2.	S. 1.	S. 1.s.	S. 1.s. B. nil	S. 1.s.	S. 1.
H	S. 3.2.	S. 3.	S. nil	S. 1. B. 3.1.	S. 1.	S. 1.	S. 1.s.	S. 3.	S. 4.	S. 1.	S. 1.s.	S. 1.	S. 3.2.	S.1.	S. 2. B. 3.2.	S. 3. B. 3.	S. 1.vs.	S. 1.vs.	S. 3.1.	S. 1.vs.	S. 1.
I	S. 4.	S. 3.2.	S. 3.1.	S. 1.	S. 1.	S. 1.	S. 3.2.	S. 3.	S. 3.2.	S. 1.	S. 1.	S. 1.	S. 1.	S. 1. B. 1.	S. 3.2.	S. 3.	S. 1.	S. 1.s.	S. 1.	S. 1.	S. 1.
J	S. 3.2.	S. 3.1.	S. 3.1. B.1.vs.	S. 1.	S. 1.	S. 1.	S. 1.	S. 3.	S. 3.	S. 1.s.	S. 1.	S. 1.	S. 1.s.	S. 2.	S. 3.2.	S. 3.	S. 1.s.	S. 1.vs.	S. 1.	S. 1.	S. 1.

Answers to Correspondents.

Spraying—Eradication of Pests.

J.L.G. (Sunshine, Vic.)—

The Director of Fruit Culture, Mr. A. H. Benson, advises that the only information immediately available is that contained in the departmental pamphlet on the Destruction of Fruit and Vegetable Pests. Many types of spraying outfits are at present on the Queensland market and are used for the spraying of the several varieties of fruits, vines, and vegetables. Regarding the value of spray pumps for the suppression of noxious weeds, such as box thorn, sweet briar, and prickly-pear, as far as our experience goes arsenical sprays will kill the growth above ground, but will not destroy the roots of box thorn and sweet briar. In the case of prickly-pear, however, if it is bruised before it is sprayed the whole plant will be destroyed.

BOTANY.

Ivory Wood.

G.D.G. (Baralaba)—

The specimen represents the Ivory Wood (*Siphonodon australe*), a native of the drier scrubs of Central and Southern Queensland, etxending into New South Wales. The wood is white and close-grained, hence the vernacular name.

Portuguese Elm.

W.R., Murgon—

A packet of seeds of the so-called Portugese Elm (*Celtis sinensis*) has been forwarded. These may be sown in boxes or flats (kerosene tins cut lengthwise) or into specially prepared beds, and planted out when deemed big enough. The tree is deciduous and loses its leaves in the winter. We have no seeds on hand at the present time of the Phytolacca Tree (*Phytolacca dioica*), but if you wrote to Mr. Dick, Purga, via Ipswich, he would no doubt send you some. He charges something like two shillings for a large packet. It germinates fairly freely, but the seed is hard and some people find it germinates quicker if soaked in hot (not boiling) water for some hours before sowing.

Love Grass.

J.H.McK., Sunnybank—

The main bulk of the material seemed to consist of *Eragrostis leptostachya*, one of the so-called "Love Grasses." When mature it is not liked a great deal by stock, but given favourable weather it keeps sending up shoots from the old roots and these are keenly fed on by stock and are said to be very nutritious. In association with Couch it has the reputation of being a good dairy grass. With this were a few other pieces of a Panicum sp.; most of the native Panic grasses make useful forage in the mixed pasture.

Wood Sorrel.

W.D.D., Innisfail—

The specimen sent is the common Wood-sorrel (*Oxalis corniculata*), a plant with a very wide distribution over the world. It has, practically speaking, no value as a fodder, and a closely related species—e.g., the common Wood-sorrel of England (*Oxalis acetosella*)—is considered dangerous on account of the high content of oxalates, which may cause serious illness and diarrhoea, and in the case of sheep even be fatal. It is also recorded that the milk of cows feeding on Wood-sorrel is with difficulty converted into butter. Wood-sorrel is very common in Queensland, but we have never heard any complaints against it.

Acacia Arabica

INQUIRER, Rockhampton—

Your specimen is *Acacia Arabica,* a tree with a wide distribution through Tropical Africa and Arabia to India and Afghanistan. In India the gum is gathered and forms one of the sources of East Indian gum arabic, but it is not, as one would suppose from its specific name, the principal source of supply, which is mostly obtained from an allied species—*Acacia Senegal.* The wood is very durable and is used in India for a variety of purposes. The beans are fed to sheep and the bark is used in tanning and dyeing. Unlike many Acacia trees, it is a very long-lived species. The tree does remarkably well in many parts of Queensland, and in one or two places, such as at Bowen and Lake's Creek (near Rockhampton), has run out quite extensively. There is a large tree at Barcaldine. All writers stress the remarkable drought-resistant qualities of the tree.

In the "Queensland Agricultural Journal" for April, 1926, Mr. Pollock (the Instructor in Agriculture) has an article on this tree, in which he states that all classes of stock greedily eat the pods, and he recommends it as a sheep fodder. It is spread by cattle eating the pods and voiding the seeds.

Eucalyptus Acmenioides.

"QUERIST" (Brisbane)—

The specimen forwarded is *Eucalyptus acmenioides* var. *carnea.* The quality of the timber is similar to that of the common type of *E. acmenioides.* The trees vary a good deal according to the soil in which they are growing; they mostly occur, however, on poor soils, and their growth is rather poor.

Rhododendron Lochae.

R.S.G., Geelong, Victoria—

So far as we know, *Rhododendron lochæ* only grows in two places, viz., some of the higher parts of the Bellenden Ker Ranges and on the top of Mt. Spurgeon. These places are rarely visited, except occasionally by naturalists, and even then, unless the plant is in flower, it can be easily overlooked. Both places, however, are comparatively easy of access.

Plants Identified.

A.J.H., Canungra—

The specimens are—

Chenopodium murale, Goosefoot or Fat Hen. This latter name in Queensland is supplied to several rampant agricultural weeds. The plant is not known to possess any harmful properties.

Hydrilla verticillata, a common water weed for which we know no common name.

Potamogeton crispus, "Curled Pond-weed."

Myriophyllum variæfolium, "The Water Milfoil."

None of these three water weeds is known to possess any poisonous or harmful qualities.

Gossypium Sturtii.

S.C.A. (Trinidad, B.W.I.)—

Gossypium Sturtii is quite a rare plant in Queensland, only now and again collected in the extreme south-western portions of the State. It is much more abundant in South Australia, and Prof. T. G. B. Osborn, Professor of Botany and Government Botanist, The University, Adelaide, South Australia, might be able to obtain seeds for you.

Farm Notes for February.

Reference was made in last month's Notes to the necessity for early preparation of the soil for winter cereals, and to the adoption of a system of thorough cultivation in order to retain moisture in the subsoil for the use of crops intended to be raised during the season. The importance of the subject, and its bearing in relation to prospective crop yields, is made the excuse for this reiteration.

The excellent rains recently experienced should have a heartening effect on all farming operations, as a good season may now be reasonably expected.

Special attention should be given to increasing the area under lucerne (broadleaf Hunter River), wherever this valuable crop will grow. Its permanent nature warrants the preparation of a thorough tilth and seed bed, and the cleansing of the land, prior to sowing the seed, of all foreign growths likely to interfere with the establishment and progress of the crop. Late in March or early in April is a seasonable period to make the first sowing providing all things are favourable to a good germination of seed.

Dairymen would be well advised to practise the raising of a continuity of fodder crops to meet the natural periods of grass shortage, and to keep up supplies of succulent fodder to maintain their milch cows in a state of production. Weather conditions, particularly the recent heavy and continuous rains, have interfered a great deal with farming operations. Although abundant supplies of grasses are in evidence, provision should be made for the inevitable period, at maturity, when these lose their succulence.

Many summer and autumn growing crops can still be planted for fodder and ensilage purposes. February also marks an important period as far as winter fodder crops are concerned, as the first sowings of both skinless and cape barley may be made at the latter end of the month in cool districts. Quick-growing crops of the former description suitable for coastal districts and localities, where early frosts are not expected, are Soudan grass, Japanese and French millet, white panicum, liberty millet, and similar kinds belonging to the Setaria family. Catch crops of Japanese and liberty millet may also be sown early in the month in cooler parts of the State, but the risk of early frosts has to be taken.

Maize and sorghums can still be planted as fodder and ensilage crops in coastal districts. In both coastal and inland areas, where dependence is placed largely on a bulky crop for cutting and feeding to milch cows in May and June, attention should be given to Planters' Friend (so-called Imphee) and to Orange cane. These crops require well-worked and manured land; the practice of broadcasting seed for sowing at this particular season encourages not only a fine stalk but a density of growth, which in itself is sufficient to counteract to some exent the effect of frost.

In most agricultural districts where two distinct planting seasons prevail, the present month is an excellent time for putting in potatoes. This crop responds to good treatment, and best results are obtainable on soils which have been previously well prepared. The selection of good "seed" and its treatment against the possible presence of spores of fungoid diseases is imperative. For this purpose a solution of one pint of formalin (40 per cent. strength) to 24 gallons of water should be made up, and the potatoes immersed for one hour immediately prior to planting the tubers. Bags and containers of all kinds should also be treated, as an additional precaution. "Irish blight" has wrought havoc at times in some districts, and can only be checked by adopting preventive measures and spraying the crops soon after the plants appear above the ground. Full particulars on the preparation of suitable mixtures for this purpose are obtainable on application to the Department of Agriculture, Brisbane.

Weeds of all kinds, which started into life under the recent favourable growing conditions, should be kept in check amongst growing crops; otherwise yields are likely to be seriously discounted. The younger the weeds the easier they are to destroy. Maize and other "hoed" crops will benefit by systematic cultivation. Where they are advanced, and the root system well developed, the cultivation should be as shallow as possible consistent with the work of weed destruction.

First sowings may now be made of swede and other field turnips. Drilling is preferable to broadcasting, so as to admit of horse-hoe cultivation between the drills, and the thinning out of the plants to suitable distances to allow for unrestricted development. Turnips respond to the application of superphosphate; 2 cwt. per acre is a fair average quantity to use when applied direct to the drills.

Where pig raising is practised, land should be well manured and put into good tilth in anticipation of sowing rape, swedes, mangels, field cabbage, and field peas during March, April, and May.

Orchard Notes for February.

THE COASTAL DISTRICTS.

February in coastal Queensland is frequently a wet month, and, as the air is often heavy with moisture and very oppressive, plant growth of all kinds is rampant, and orchards and plantations are apt to get somewhat out of hand, as it is not always possible to keep weed growth in check by means of cultivation. At the same time, the excessive growth provides a large quantity of organic matter which, when it rots, tends to keep up the supply of humus in the soil, so that, although the property looks unkempt, the fruit-producing trees and plants are not suffering, and the land is eventually benefited. When the weed growth is excessive and there is a danger of the weeds seeding, it is a good plan to cut down the growth with a fern hook or brush scythe and allow it to remain on the ground and rot as it will thereby prevent the soil from washing, and when the land is worked by horse power or chipped by hand it will be turned into the soil. This is about the most satisfactory way of dealing with excessive weed growth, especially in banana plantations, many of which are worked entirely by hand.

The main crop of smooth leaf pineapples will be ready for canning, and great care must be taken to see that the fruit is sent from the plantation to the cannery with the least possible delay and in the best possible condition. The only way in which the canners can build up a reputation for Queensland canned pineapples is for them to turn out nothing but a high-class article. To do this they must have good fruit, fresh, and in the best of condition.

The fruit should be about half-coloured, the flesh yellowish, not white, of good flavour, and the juice high in sugar content. Over-ripe fruit and under-ripe fruit are unfit for canning, as the former has lost its flavour and has become "winey," while the latter is deficient in colour, flavour, and sugar content.

For the 30 or 32 oz. can, fruit of not less than 5 in. in diameter is required, in order that the slices will fit the can; but smaller fruit, that must not be less than 4 in. or, better still, 4¼ in. in diameter, and cylindrical, not tapering, can be used for the 20-22 oz. can.

Bananas for shipment to the Southern States should on no account be allowed to become over-ripe before the bunches are cut; at the same time, the individual fruit should be well filled and not partly developed. If the fruit is over-ripe it will not carry well, and is apt to reach its destination in an unsaleable condition.

Citrus orchards require careful attention, as there is frequently a heavy growth of water shoots, especially in trees that have recently been thinned out, and these must be removed. Where there are facilities for cyaniding, this is a good time to carry out the work, as fruit treated now will keep clean and free from scales till it is ready to market. Citrus trees can be planted now where the land has been properly prepared, and it is also a good time to plant most kinds of tropical fruit trees, as they transplant well at this period of the year.

A few late grapes and mangoes will ripen during the month and, in respect to the latter, it is very important to see that no fly-infested fruit is allowed to lie on the ground but that it is gathered regularly and destroyed. Unless this is done, there is evry probability of the early citrus fruits being attacked by flies bred out from the infested mangoes.

Strawberries may be planted towards the end of the month, and, if early-ripening fruit is desired, care must be taken to select the first runners from the parent plants, as these will fruit quicker than those formed later. The land for strawberries should be brought into a state of thorough tilth by being well and deeply worked. If available, a good dressing of well-rotted farmyard manure should be given, as well as a complete commercial fertiliser, as strawberries require plenty of food and pay well for extra care and attention.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

The marketing of later varieties of peaches and plums, and of mid-season varieties of apples and pears, as well as of table grapes, will fully ocupy the attention of fruitgrowers in the Granite Belt, and the advice given in these notes for the two previous months, with regard to handling, grading, packing, and marketing is again emphasised, as it is very bad policy to go to all the trouble of growing fruit and then, when it is ready to market, not to put it up in a way that will attract buyers.

Extra trouble taken with fruit pays every time. Good fruit, evenly graded and honestly packed, will sell when ungraded and badly packed fruit is a drug on the market. Expenses connected with the marketing of fruit are now so high, owing to the increased cost of cases, freight, and selling charges, that it is folly to attempt to market rubbish.

During the early part of the month it will be necessary to keep a careful watch on the crop of late apples in order to see that they are not attacked by codlin moths. If there is the slightest indication of danger, a further spraying with arsenate of lead will be necessary, as the fruit that has previously escaped injury is usually that which suffers the most.

Fruit fly must also be systematically fought wherever and whenever found, and no infested fruit must be allowed to lie about on the ground.

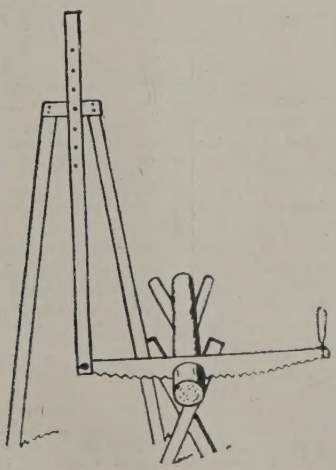
Grapes will be ready for market, and in the case of this fruit the greatest care in handling and packing is necessary. The fruit should never be packed wet, and, if possible, it is an excellent plan to let the stems wilt for a day at least before packing. This tends to tighten the hold of the individual berries on the stem and thus prevent their falling off.

In the western districts winemaking will be in progress. Here again care is necessary, as the better the condition in which the fruit can be brought to the press the better the prospect of producing a high-class wine.

Where necessary and possible citrus trees should be given a good irrigation, as this will carry on the fruit till maturity, provided it is followed up by systematic cultivation so as to retain a sufficient supply of moisture in the soil.

ONE-MAN SAW.

A very handy sawing device for sawing up the trunks of small trees into short blocks for fuel, to be operated by a single man, is rigged from the ordinary two-man crosscut saw, as shown in the accompanying illustration taken from "Country Gentleman." Two scantlings, each 8 feet long, are driven into the ground about 3 feet apart with their upper ends leaning almost together. Two 3-inch strips are nailed across the sides of the tops of these posts, through the centre of which is bored a ½-inch hole. A bolt of the same size is passed through this hole and through a hole in a 2 inch x 2 inch scantling standing vertically—this scantling being on the outside of the cross strips—providing a free-swinging support for the end of the saw blade. This is shown in the illustration.



There are several holes in this pendulum scantling for adjusting the blade up or down. One of the handles is removed from the blade and a small bolt is passed through the small hole in the end of the blade and through the lower end of the scantling. Either a sawhorse may be used or cross stakes may be driven in the ground as illustrated to hold the logs while being sawed. As the saw moves back and forth the swinging scantling holds the end of the saw steady. The device is easily rigged, and is very much appreciated when once tried by those who need to cut wood for fuel.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

1927.	JANUARY.		FEBRUARY.		MOONRISE. Jan.	Feb.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	5.1	6.49	5.26	6.46	2.33	3.44
2	5.2	6.49	5.26	6.45	3.17	4.48
3	5.3	6.49	5.27	6.45	4.6	5.57
4	5.3	6.50	5.28	6.44	5.2	7.5
5	5.4	6.50	5.28	6.44	6.4	8.13
6	5.5	6.50	5.29	6.43	7.9	9.17
7	5.6	6.51	5.30	6.42	8.16	10.22
8	5.6	6.51	5.31	6.42	9.21	11.24
					p.m.	p.m.
9	5.7	6.51	5.31	6.41	10.25	12.25
10	5.8	6.51	5.32	6.40	11.27	1.27
					p.m.	
11	5.9	6.51	5.33	6.40	12.29	2.27
12	5.9	6.51	5.34	6.39	1.31	3.25
13	5.10	6.51	5.34	6.38	2.31	4.19
14	5.11	6.51	5.35	6.37	3.34	5.1
15	5.12	6.51	5.36	6.37	4.34	5.54
16	5.13	6.51	5.36	6.36	5.30	6.34
17	5.13	6.51	5.37	6.35	6.22	7.11
18	5.14	6.51	5.38	6.34	7.0	7.45
19	5.15	6.51	5.38	6.34	7.58	8.10
20	5.16	6.50	5.39	6.33	8.35	8.46
21	5.16	6.50	5.40	6.32	9.11	9.15
22	5.17	6.50	5.40	6.31	9.45	9.49
23	5.18	6.49	5.41	6.30	10.15	10.22
24	5.19	6.49	5.42	6.29	10.46	11.1
25	5.19	6.49	5.42	6.28	11.16	11.42
26	5.20	6.48	5.43	6.27	11.50	nil
					a.m.	a.m.
27	5.21	6.48	5.44	6.26	nil	12.31
					a.m.	
28	5.22	6.48	5.44	6.25	12.25	1.25
29	5.23	6.47	...	...	1.0	...
30	5.24	6.47	...	...	1.53	...
31	5.25	6.47	...	...	2.45	...

Phases of the Moon, Eclipse, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

4	January	● New Moon	6 27	a.m.
11	,,	☾ First Quarter	12 43	a.m.
18	,,	○ Full Moon	8 26	a.m.
26	,,	☽ Last Quarter	12 5	p.m.

Perigee, 7th January, 1 6 p.m.
Apogee, 23rd January, 1 18 p.m.

When the Sun rises on 4th January it will be under circumstances quite unusual. Instead of the full-orbed Sun the greater part of its face will be darkened by the intervening Moon and only about one-fifth of the usual brilliant orb will bring modified daylight at Warwick and Toowoomba. Right across the Pacific Ocean and part of South America the magnificent phenomenon of an annular or ring-shaped eclipse of the Sun will occur.

The fact that the Earth and Moon will be in Perihelion at the time of the Eclipse is the principal reason why an annular instead of a total eclipse will result.

An occultation of Epsilon Tauri, a small star of magnitude 3·6, will take place about 40 minutes after midnight. The star will disappear before the bright edge of the Moon reaches it, the cause being the dark or unlit portion of the Moon preceding the brightened surface.

Mercury will be in superior conjunction with the Sun on the 28th, that is on the path of its orbit beyond the Sun and farthest from the Earth. Mercury will not be directly behind the Sun but two degrees, or four times the diameter of the Moon, above it.

2	February	● New Moon	6 54	p.m.
9	,,	☾ First Quarter	9 53	a.m.
17	,,	○ Full Moon	2 18	a.m.
25	,,	☽ Last Quarter	6 42	a.m.

Perigee, 4th February, 10 6 a.m.
Apogee, 20th February, 4 6 a.m.

By the middle of February Jupiter and Mercury will set so soon after the Sun as to be unobservable. Venus also will be low down near the western horizon.

Jupiter and Mercury will be in conjunction on the 13th, at 10 p.m., about three hours after they have set.

The most distant planet, Neptune, will be opposite the Sun on the 15th. Owing to its great distance from the Earth, it is only a small telescopic object. On the 16th it will be in conjunction with the Moon at 9 p.m., when it will be eight times the diameter of the Moon above it and, apparently, in the constellation Leo.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]